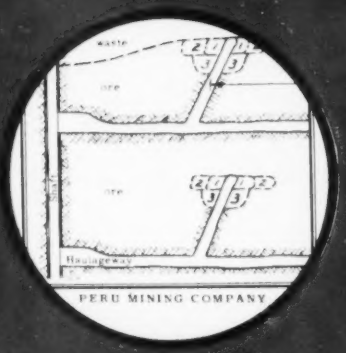
MINING WORLD



In this issue

Peru Mining Company Expands

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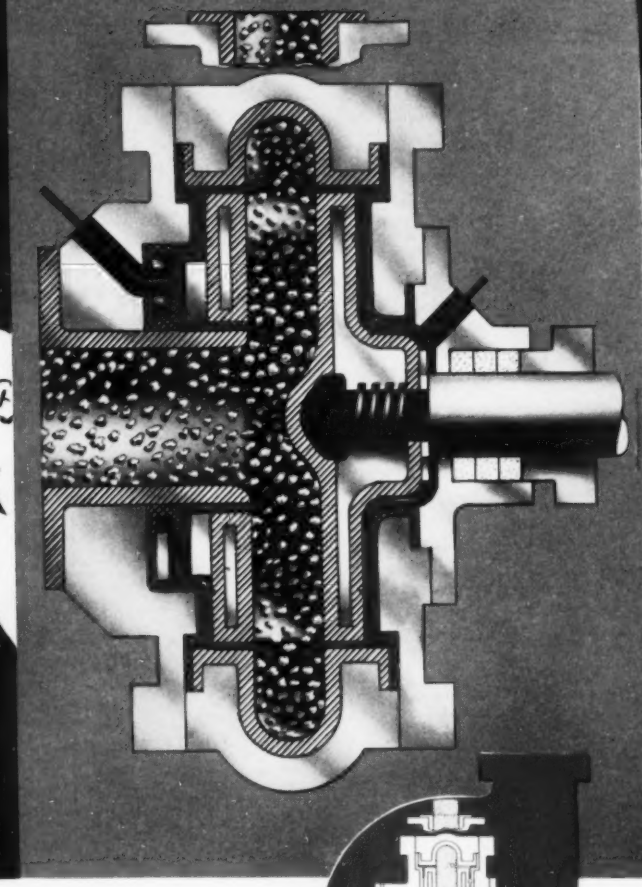
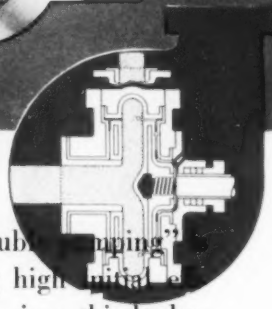
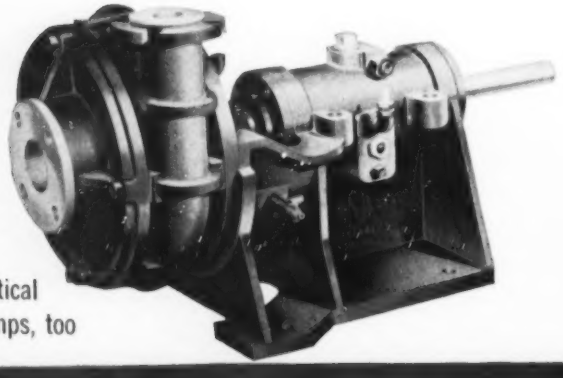
AUGUST, 1952
Vol. 14 No. 8

Abrasives out!





Abrasives are kept from making trouble in Hydroseal Pumps by a small amount of clear water that flows in the direction shown by the arrows. At a pressure slightly above pump discharge, this sealing water prevents abrasives from entering the clearances between the impeller and side plates. "Doubl[illegible]mping" is thus eliminated, giving high [illegible]itial e[illegible]ciency. More important, since this hydrosealing protects close clearances from wear, these pumps maintain their high efficiency for life. As a result, power savings alone generally pay for Hydroseals in a short period of time.



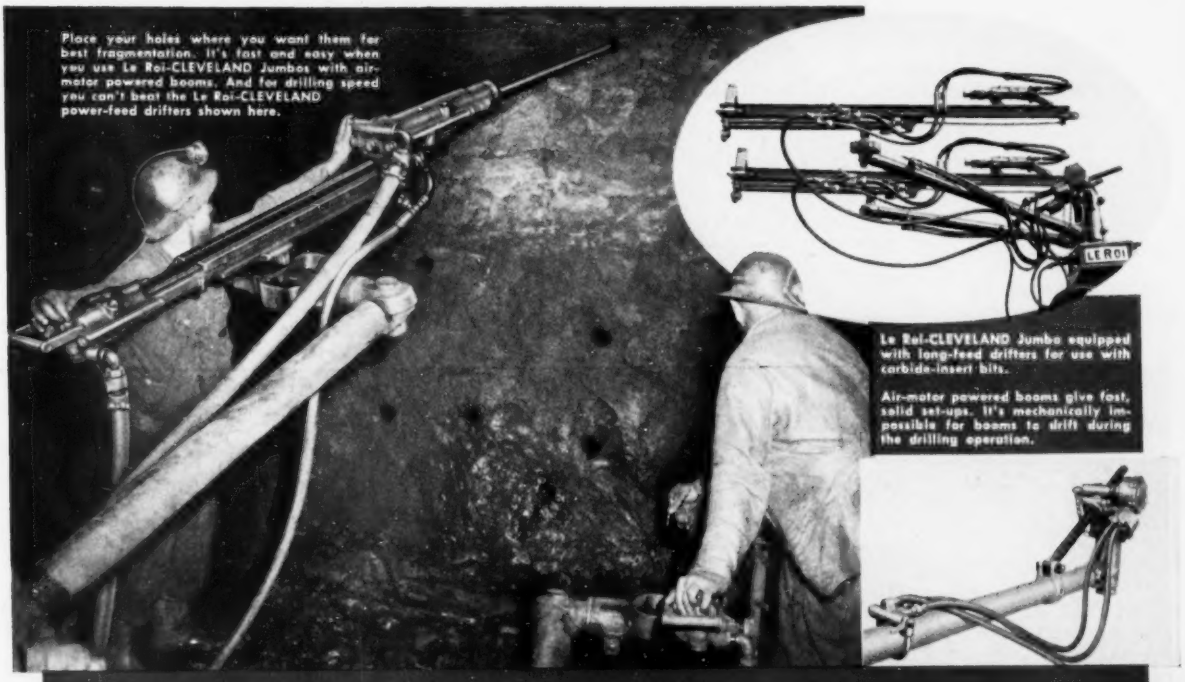
Vertical pumps, too

If you have a decision to make on sand, slurry, or dredge pumps, get the Hydroseal facts before you make up your mind. Write for Catalog No. 552.

THE ALLEN-SHERMAN-HOFF PUMP CO.
Dept. J—259 E. Lancaster Ave., Wynnewood, Pa.
Representatives in Most Principal Cities

HYDROSEAL SAND, SLURRY & DREDGE PUMPS
MAXIMIX RUBBER PROTECTED

HYDROSEAL, PACKLESS AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD



Drilling-Cycle Time Reduced, Footage per Shift Increased

. . . when you use Le Roi-CLEVELAND Jumbos and power-feed drifters in your rock headings

THERE are three things you have to do if you want to save time in your drilling cycle and increase your footage — reduce set-up time, drill out the round faster, and shorten tear-down time.

You know this and so do we. That's why we designed the Le Roi-CLEVELAND jumbo the way it is. And that's also why our drifters drill so fast.

Let's see what you get when you use Le Roi-CLEVELAND:

★ The most flexible jumbo available. Air-motor powered booms let you space your holes quickly and easily for most efficient fragmentation.

★ Rigid, non-slip set-up feature keeps drifters in line, prevents steel binding, saves wear and tear on chucks, results in higher average drilling speeds.

★ Strong rotation, plus snappy yet powerful force of blow of Le Roi-CLEVELAND drifters gives you unexcelled drilling speed. This drilling speed coupled with the fast, positive feeding action of our power feed gives you the right pressure for fastest drilling and reduces drill-steel changing time.

You add all these advantages together when you use Le Roi-CLEVELAND jumbos and power-feed drifters. The outcome is faster drilling cycles, more footage per shift—so why not standardize on these cost-cutting honeys. Write for complete information.

LE ROI COMPANY RD-42

CLEVELAND ROCK DRILL DIVISION
12500 Berea Road, Cleveland 11, Ohio
***Plants:* Milwaukee, Cleveland and Greenwich, Ohio**

MINING WORLD, August, 1952. Volume 14 No. 9. Published monthly, except April when publication is semi-monthly, at Emmett St., Bristol, Conn. Executive, advertising and editorial offices, 121 Second St., San Francisco 5, California. Subscription in United States, North, Central and South America, $3.00 per year; other countries, $4.00 per year. Entered as second class matter Oct. 10, 1951 at the Post Office at Bristol, Conn., under the act of March 3, 1879. Postmaster: please send notice 3579 to MINING WORLD, 71 Columbia St., Seattle 4, Washington.

With a double-drum hoist, the Pacific RTC Block guides Pacific Slushmaster Scraper on 90° turn. Photo courtesy of Bunker Hill and Sullivan Mining and Concentrating Co., Kellog, Idaho.

PACIFIC
Sheave Block
Model C Half Shroud

PACIFIC
"ROUND-THE-CORNER"
Sheave Block

PACIFIC
"SLUSHMASTER"
SCRAPER
Model 2A 34"

Here you see a two-drum hoist pulling a fully loaded Pacific "Slushmaster" scraper around a 90° right turn with the help of a Pacific "Round-The-Corner" Sheave Block and a Pacific Half Shroud Sheave Block. With this Pacific Team, you can pull your scraper around any number of turns.

It's the "Right Turn" profit-wise, too. Operating experience shows that you can cut the cost of mucking out a square-set round in half! Be on the winning side. Pacific Teamwork is paying off for others and will do the same for you. Write today for complete information.

ALLOY STEEL AND METALS CO.

1848 EAST 55TH STREET
LOS ANGELES 58, CALIF.

Mailing Address: Box 15323 Vernon Station, Los Angeles 58, Calif.

BE SPECIFIC—ORDER PACIFIC
Jaw Crushers, Sheave Anchors, Bit Knockers and Pacific Wearing Parts

ROCK RATED!

FOR ROCK BOTTOM COSTS

P&H MAGNETORQUE*

puts an end to the old swing frictions

We'll make this promise: You'll never have to "baby" this machine, even in the heaviest going! It's *built* for it — all-welded of alloy steels throughout, the toughest construction known. *It means steady digging.*

But the big pay-off in extra production comes with Magnetorque electric swing — enough faster to deliver 5 cycles to 4 on other machines in the 2½ yd. class. And the "time-outs" for adjustment and replacement of swing friction linings can now be salvaged for increased yardage. Magnetorque lasts the life of the machine.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

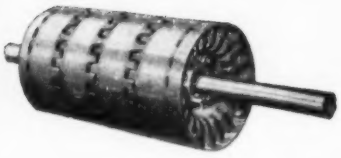
HARNISCHFEGER
CORPORATION
2400 East Imperial Highway • Los Angeles 59, Calif.

Ask today for facts about the 955-A. Also the Model 1055 — its companion machine with 3½ yd. capacity.

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

Which Answers Your Tramp Iron Problem BEST?

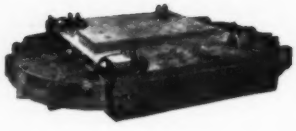
MAGNETIC PULLEYS?



Powerful, air cooled electro magnetic pulleys are ideal where well loaded conveyor belts are used. Installed as head drive pulley, tramp iron is discharged automatically. Low operating cost, long life and extreme power characterize this workhouse of the Dings line. Catalog C-1001A tells you why this magnet is exceptionally efficient.

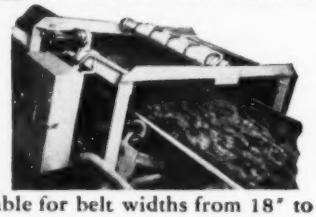
Dings *non-electric, self-energized* Perma Pulley magnets are recommended where burden depths do not exceed 3". Within this range, these are the magnets to use because of their unsurpassed concentration of magnetic strength near the surface. Catalog C-1007A.

SUSPENDED RECTANGULARS?



Power close and power that searches down as deep as 30" to yank tramp iron out. If the Dings RM rectangular won't do it, it can't be done. Triple pole, double gap design. Install horizontally, vertically or at an angle above belt conveyors or in chutes. Self-cleaning fully automatic models also available. Write for details.

MAGNETIC DETECTOR?



The Dings Magnetic Detector instantly signals when any magnetic object large enough to be damaging passes through the detector zone. Can be hooked up to sound an alarm and stop the belt. Ideal protection for crushers, grinders, pulverizers, etc., where belt speeds are so excessive or burden depths so great no magnetic separator can function successfully. Detectors are available for belt widths from 18" to 72". Two types are available. One employs an electro magnet and the other, a permanent magnet. Performance of the two is comparable.

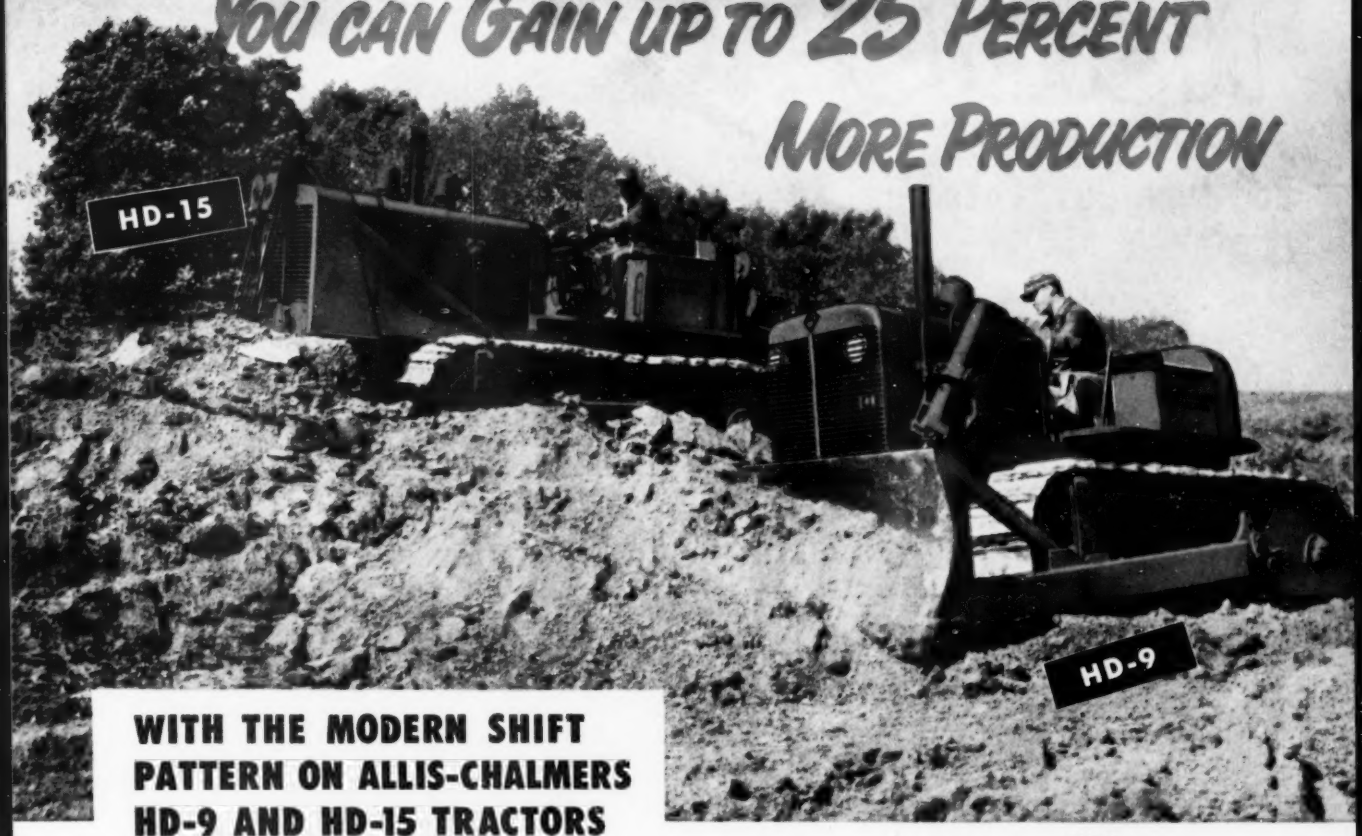
Magnets shown here are available in size ranges for most applications. Special magnets can be made for any application. Write today for recommendations.

DINGS MAGNETIC SEPARATOR CO.
4719 W. Electric Ave., Milwaukee 46, Wis.

Dings Certified MAGNETIC STRENGTH

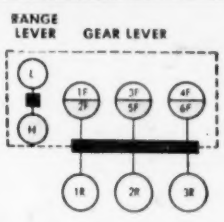
On saved shifting time alone

YOU CAN GAIN UP TO 25 PERCENT MORE PRODUCTION



WITH THE MODERN SHIFT PATTERN ON ALLIS-CHALMERS HD-9 AND HD-15 TRACTORS

It takes just half the time and effort to change from low forward to fast reverse with the Allis-Chalmers HD-9 and HD-15 transmission. This shifting time saved becomes production time gained on bulldozing and other jobs calling for a short forward-backward cycle. For example, job studies prove that on backfilling, pusher work, working around large excavators, digging and loading with front-end shovels — other jobs where frequent shifts are required — you can make five passes in the time usually required to make four... actually increase production up to 25 percent.



Here's how it works

You go from any forward to any reverse speed with one simple shift of the gear lever. The only time you touch the range lever is to select the forward range you want for the job to be done — just set it and forget it.

The constant-mesh Allis-Chalmers transmission makes shifting smooth and effortless . . . without gear clashing. And it's so easy that the operator can *always* take advantage of high-speed reverse.

This exclusive shift pattern, together with all-steel welded construction, unit assembly, 1,000-hour lubrication, are just a few of the reasons you get more work done with the new *designed-for-your-job* Allis-Chalmers tractors.

THE NEWEST, FINEST LINE ON EARTH!

HD-5	HD-9	HD-15	HD-20
40 drawbar hp., 11,250 lb.	72 drawbar hp., 18,800 lb.	109 drawbar hp., 27,850 lb.	Hydraulic torque Converter Drive, 175 net engine hp., 41,000 lb.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Norblo
AUTOMATIC
Bag Type Dust Collection

Cutaway shows Norblo basic unit of 78 bags. Automatic shaking and bag cleaning, one unit at a time, insures full use of cloth area better than 99% of the time.

Rugged, Efficient, Economical
. . . Pays for itself Quickly

For continuous and heavy duty service at constant capacity and efficiency, Norblo Automatic Bag Type Dust and Fume collection pays its own way—in the recovery of valuable materials or the removal of injurious or "nuisance" industrial air contaminants. Norblo builds the entire installation, from blowers to bag-cleaning mechanisms. Complete systems are engineered to meet specific situations, production layouts and required capacities. Norblo engineering insures low maintenance and no shut-downs—guarantees performance of every installation. Write for Bulletin 164-3.

Norblo also builds centrifugal and hydraulic dust collectors, exhaust fans, cement air cooling systems and portable dust collectors.

THE NORTHERN BLOWER COMPANY

Engineered Dust Collection Systems for All Industries

6420 BARBERTON AVE. • CLEVELAND 2, OHIO

get FULL VALUE loading...
choose GARDNER-DENVER Mine Car Loaders

a FULL *dipper every bite . . .*

because two high torque air motors function together on the powerful crowding action—and the Gardner-Denver moving fulcrum provides extra force for digging into stubborn muck piles.

FULL *to the top mine car loads . . .*

Extra speed developed by the moving fulcrum as the dipper nears discharge position throws the ore far back to completely fill your big capacity mine cars.

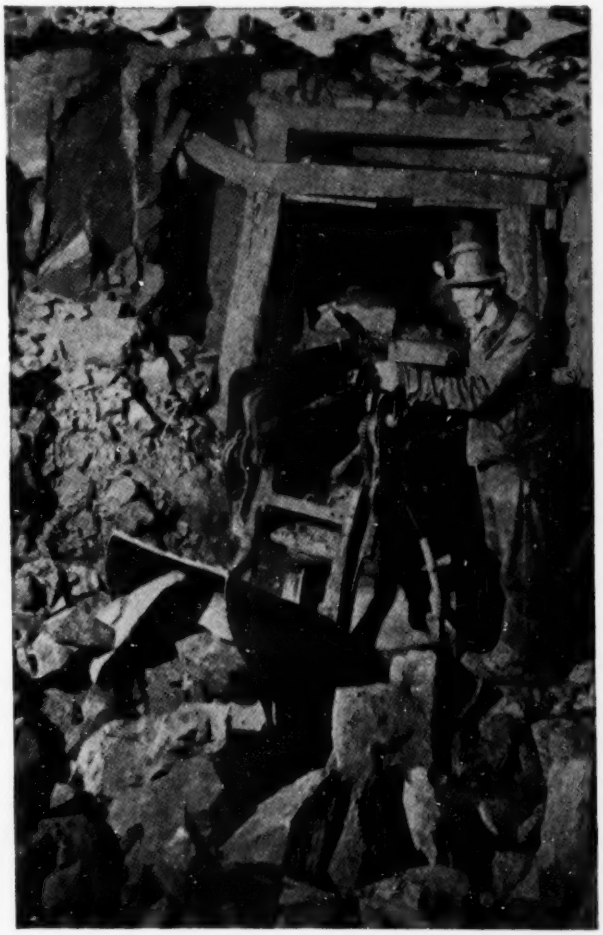
FULL *time availability . . .*

Heavy-duty construction, fewer moving parts and protected lubrication keep Gardner-Denver Mine Car Loaders underground—enable you to plan on using your Gardner-Denver Loader 'round the clock, at several different faces.

FULL *measure of safety . . .*

Low center of gravity, clean exterior design, simple and convenient controls and other safety features protect your miners against injury.

Send today for Bulletin MCL.



Gardner-Denver Loader quickly cleans up a round of coarse, abrasive muck.

The smaller GD9 Mine Car Loader—for fast loading in low or narrow headings.

The GD14 "Big Bite" Loader—for high tonnage loading into big mine cars.

SINCE 1859 **GARDNER-DENVER**

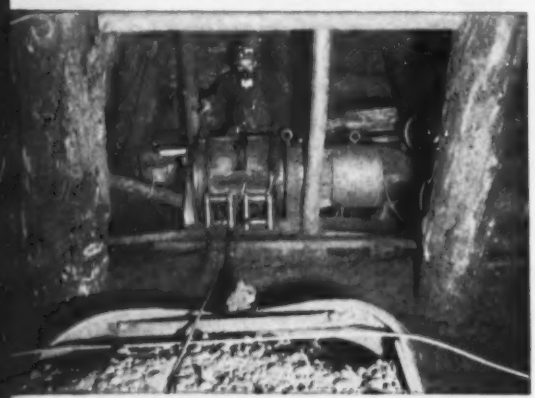
Gardner-Denver Company, Quincy, Illinois, U.S.A.
Export Division: 233 Broadway, New York 7, N.Y., U.S.A.

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

JOY AAF-211 *double-drum slusher in a lead-zinc mine. Mounted on a turntable, scrapes alternately from two headings.*

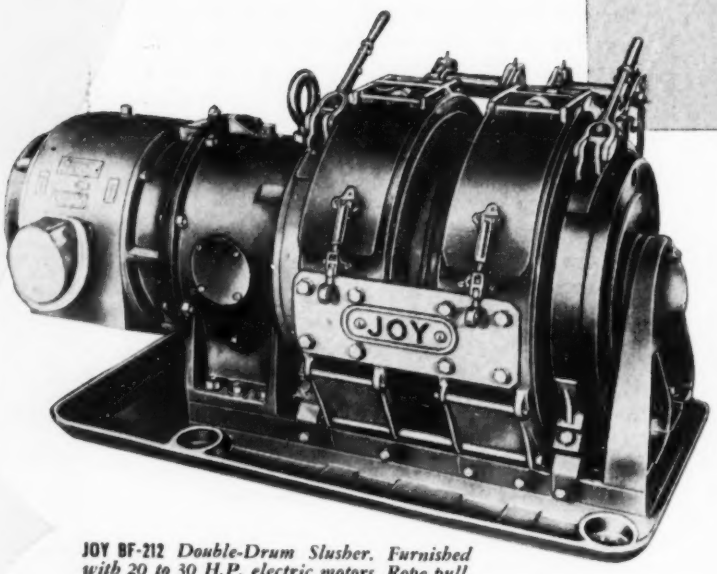
JOY AF-211 *three-drum slusher in a large open stope in a western copper mine.*

JOY AAF-211 *double-drum slusher in a cut-and-fill stope in a copper mine.*

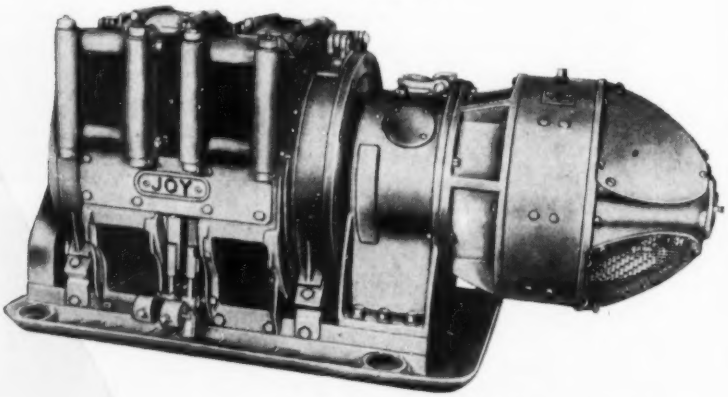


JOY BF-211 *double-drum slusher pulling ore to a chute in a Michigan iron ore mine.*

Here's why



JOY BF-212 *Double-Drum Slusher. Furnished with 20 to 30 H.P. electric motors. Rope pull, with drum half-full of rope, up to 3700 lbs.*



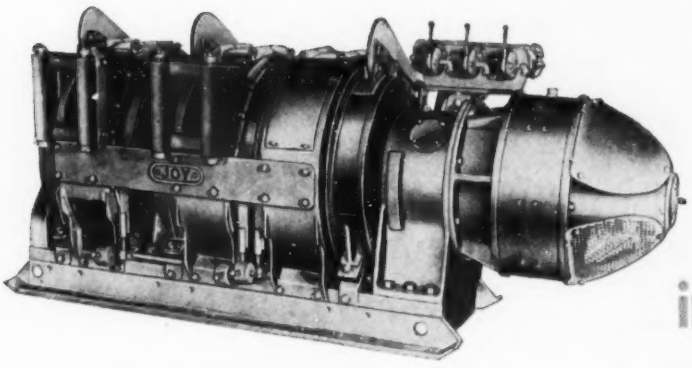
JOY CF-211 *Double-Drum Slusher. 30 to 60 H.P. electric motors. Rope pull up to 6800 lbs., with drum half full of rope.*

OVER 100 YEARS OF ENGINEERING LEADERSHIP

JOY

JOY SLUSHERS

set the standards for the industry



JOY CF-312 *Three-Drum Slusher equipped with air-clutch control for ease of operation. Electric motors from 30 to 60 H.P. Rope pull, with drum half-full of rope, is up to 6600 lbs.*

They're used and preferred in every mining field—because:

- ★ Their simple, compact design and rugged construction insure a long lifetime of trouble-free service under the roughest conditions.
- ★ The power unit can be easily removed, transported to the shop and overhauled without bringing the slusher above ground.
- ★ Automatic band-type brakes furnish retarding action, during unwinding, which eliminates backlash.
- ★ Open clutch bands dissipate heat quickly and permit easy inspection of linings. It's but a two-minute job to remove clutch for renewal of lining.

Joy Slushers are produced in over 300 types and sizes—from 3 to 150 H.P. Consult a Joy Engineer for the size and type best for your scraping job. ● *Write for Bulletin 76-Y.*

Have you seen this film?

"HARD ROCK MECHANIZED MINING"

16MM—Sound and Full Color—40 Minutes

Write for a FREE Showing

Address our Film Booking Office.

Consult a Joy Engineer

W&D M 4029

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

When there's "TROUBLE IN THE AIR"

...BE READY with this dependable M·S·A BREATHING EQUIPMENT

M·S·A SELF-RESCUER

For immediate breathing protection in emergencies caused by fire or explosion, M.S.A. developed the Self-Rescuer. This approved safety item provides the precious minutes of emergency breathing protection so vital to the miner while traveling through carbon monoxide to fresh air.

The Self-Rescuer is available in individual carrying case or in Cache Assemblies of six units for storage in working sections, on mantrip cars and along conveyor lines. U.S. Bureau of Mines Approved. Bulletin No. EC-1.

M·S·A PNEOLATOR

Automatically inflates the lungs with oxygen—continuously, rhythmically, effectively, safely. No suction cycle—exhalation takes place by the normal passive recoil of the respiratory muscles and lungs. Immediate change over to inhalation phase. Bulletin No. CH-3. Note: The first few minutes after breathing has ceased are the most critical. Immediate application of manual artificial respiration should be started and continued until the Pneolator is available.

M·S·A CHEMOX®

Miners equipped with the M.S.A. Chemox Apparatus can safely travel through any area with the complete assurance that their breathing is safeguarded. This completely self-contained unit generates its own oxygen supply from a replaceable canister and can be put into service in seconds. Weighing only 13½ lbs., it is designed for freedom of movement. U.S. Bureau of Mines Approved. Bulletin No. B-14.

MSA
SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service. Our job is to help you.

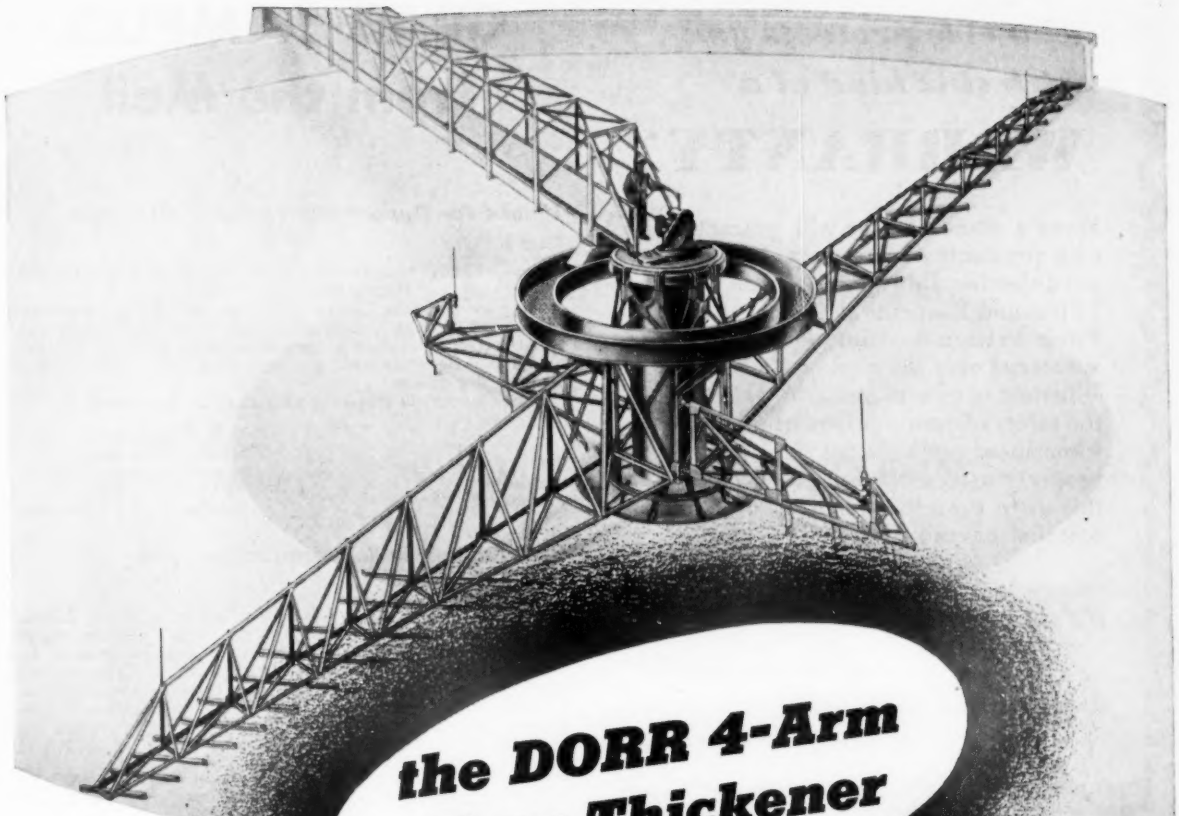
MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STS., PITTSBURGH 8, PA.

At Your Service: 68 Branch Offices in the United States

MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED

Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N.S.
Representatives in Principal Cities in Mexico, Central and South America
Cable Address: "MINSAF" Pittsburgh



the DORR 4-Arm Torq Thickener

Makes lighter Work of HEAVY Ore Tailings

To handle heavy granular solids subject to widely fluctuating feeds — note the 4-arm feature of the Dorr Torq Thickener.

Two long arms rake the outer section of the tank floor. The two short arms handle the load in the inner section, raking all the solids to a conventional center-cone discharge. All four arms are provided with the exclusive Torq feature . . . which reduces overload by continuous raking action . . . eliminates the danger of stalling and damaging the unit.

For more information about the mechanical advantages of the 4-Arm Torq and the complete Dorr Thickener line, ask us to send you a copy of Bulletin No. 3001. THE DORR COMPANY, Barry Place, Stamford, Conn.

Torq is a registered trademark of The Dorr Company.

Better tools TODAY to meet tomorrow's demand

DORRCO

DORR

WORLD - WIDE RESEARCH • ENGINEERING • EQUIPMENT

THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.

Offices, Associated Companies or Representatives in principal cities of the world.

GRAB SAMPLES From the Mail

Thanks For Opportunity To Make Alteration

Dear Sir:

May we draw your attention to an inaccuracy in the October (1951) edition of *Mining World*.

On page 65 under "India," you state that Central Provinces Manganese Ore Co. Ltd., is installing a Wemco Mobilmill. This is not correct. The plant in question is being specially designed by Mineral Recovery Ltd., the separating vessel only being of Wemco manufacture!

Perhaps you will make the alterations in due course.

F. T. C. Doughty
Managing Director
Mineral Recovery Ltd.
17 Victoria Street
London S. W. 1, England

Useful to New Indian Manganese

Dear Sir:

I am highly grateful to you for kindly supply *World Mining* regularly to me. I can say no more about the magazine except that it is worth going through several times, particularly by people who are in active mining concerns. . . . I have been appointed mining engineer in the new concern whose address is below and I really am in need of books which deals with present day mining like *World Mining*. I hope to receive the next copy addressed to my new address here.

M. S. Krishnan, B.Sc.
Mining Engineer
c/o M/S. T.P. Sao
Ghatkuri Iron & Manganese Mines
P.O. Gua, Singhbhum District,
Bihar, India

Major Iron Producer in Goa

Dear Sir:

I ask you to kindly send your magazine to an important mining enterprise in Portuguese India, Messrs. Chowgule & Co. at Goa. This is an important iron mine which is beginning to be exploited, being now the largest potential producer in all the Portuguese territories. They actually have a capacity of 1,000,000 tons per year but are operating now at only 500,000 tons which is the maximum capacity of the Mormugao harbor. When this harbor is improved it is anticipated that production will be more than the 1,000,000 tons per year.

F. Chavez
Praga da Alegria 58-5A
Lisbon, Portugal.

Appreciated For Many Years

Dear Sir:

I would be most obliged if you would enter my name on your mailing list for the *World Mining*. I have appreciated your magazine for many years in the past, but I now would like to get it personally and regularly. I am associated with a number of base metal mining companies in this country, as consulting geologist and engineer.

Dr. K. P. Chikara
Alacrity House
Salisbury, Southern Rhodesia.

Excellent In Every Way

Dear Sir:

World Mining is excellent in every way and I appreciate reading it very much.

John C. George
The New Cumnock Collieries, Limited
124 Saint Cincent Srteet
Glasgow, C. 2
Scotland.

TIMKEN
MULTI-USE
ROCK BIT

These TIMKEN® rock bits are interchangeable

TIMKEN
CARBIDE-INSERT
ROCK BIT

on the same steel!

DRILLERS need only one type of steel on the job when they use Timken® interchangeable rock bits. Both Timken multi-use and carbide insert bits, in the same series, fit the same threaded drill steel. And they can be changed right on the job!

If you're drilling in ordinary ground, use Timken multi-use bits. If correctly controlled and reconditioned, they'll give you the lowest cost per foot of hole when full increments of steel can be drilled.

If you're drilling in hard, abrasive ground, change quickly to Timken carbide inserts. They are most economical for maximum speed drilling, very deep holes, small diameter blast holes and constant gauge holes.

Interchangeable in each thread size, both Timken multi-use and carbide insert bits have these three important advantages: (1) made from electric furnace Timken fine alloy steel, (2) threads are not subject to drilling impact because of the special union developed by the Timken Company, (3) can be changed quickly and easily.

With 20 years of experience in the rock bit field, the Timken Rock Bit Engineering Service is ready to help you choose the best bits for *your* job. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

your best bet for the best bit...for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

. . . and another

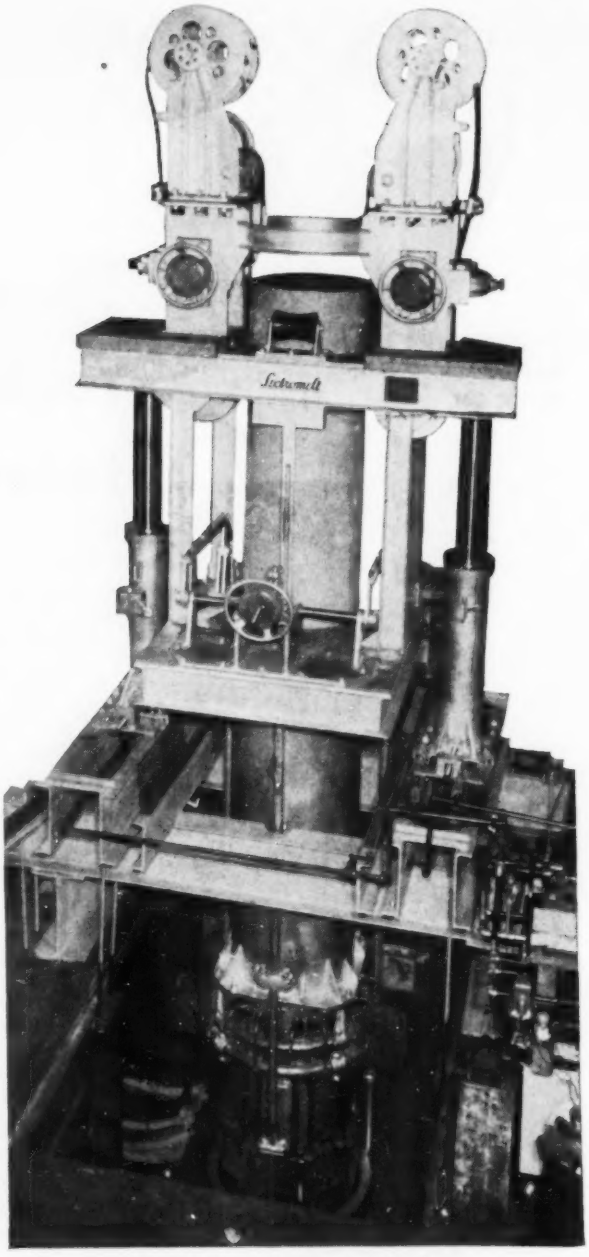
Lectromelt®

Smelter is on its way

Lectromelt self-baking electrodes offer these typical advantages:

1. The complete structure is supported on two I-beams just above the furnace roof, resulting in lower and lighter building construction above.
2. No movable parts required at clamp level such as bolts, nuts, springs, etc., which can be damaged by flame.
3. Remote-control clamping device allowing for quick and simple electrode adjustment and easy replacement of clamp shoes.
4. Pressure ring exerts uniform pressure and holds electrode circular.
5. Four cable supports providing minimum distortion of casing at clamp.

For a further listing of advantages of Lectromelt self-baking electrodes and more data on the above, write Pittsburgh Lectromelt Furnace Corporation, 324 32nd St., Pittsburgh 30, Pa.



One of three self-baking electrodes for a ferromanganese smelting furnace on Lectromelt's erection floor; testing is completed and ready for shipment.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.

®REG. T. M. U. S. PAT. OFF.

WHEN YOU MELT... MOORE RAPID *Lectromelt*

HEWITT-ROBINS

These Are The Results You Can Get Only With A HEWITT-ROBINS ORE MINE CONVEYOR

HERE'S

- First unit of its type to demonstrate successful ability to handle such things as *metallic* ore for stope and main haulage.
- All members specially designed for handling ore —including terminals and intermediate sections.
- Drop-in intermediate sections available in 8', 10' & 12' lengths and in widths 26", 30", 36", 42" and wider.
- A choice of 4 idler sizes—genuine Hewitt-Robins 4", 5", 6", & 7" idlers.

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PROOF...

This is an actual example of what you can do when you install a genuine Hewitt-Robins Ore Mine Conveyor underground . . .

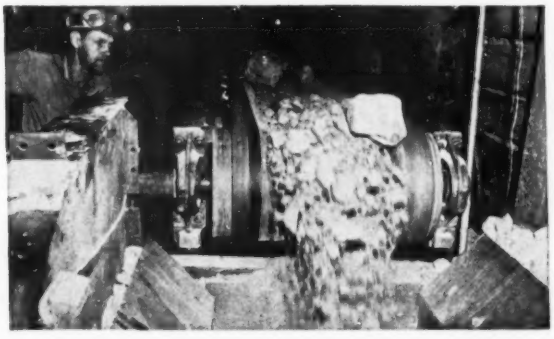
Conventional Methods Costly

A western copper mine operated three stopes by conventional methods in extremely heavy ground with rock highly altered and high moisture content. Ore moved from the stopes on short transfer raises, was bottomed in individual pony set chutes and drawn to haulage cars in a standard haulage drift.

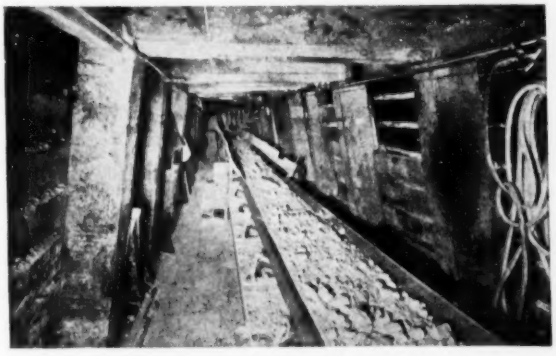
Results were not too good . . . costs were too high because of excessive weight conditions with track haulage. This method also limited the tonnage that could be drawn each 24 hours due chiefly to time out for haulage drift repairs. This, in turn, required that extraction openings be maintained at a high cost over too long a period.

The Hewitt-Robins Solution

To solve the problem, a 200-foot Hewitt-Robins Ore Mine Conveyor was installed as a lateral transfer unit in a sub-drift under the slusher and grizzly level.



The benefits were immediate. Faster, more uniform drawing was possible with less time exposure to excessive maintenance costs. And 1,400 to 1,600 tons/day were drawn compared with approximately 632 tons/day average in the best of the previous 3 stopes. Now, more blocks are being caved, using additional Hewitt-Robins Ore Mine Conveyors.



Simplifies Timber Repairs

Whereas timber repairs on the haulage levels formerly had to be done on a shift when the stope was down (because track operation interfered with repair crews) all necessary repair work in the conveyor drift can be done while ore is moving and the stopes are in full operation.

Simpler, faster train cycle operation is also possible. No longer is there the need to shop around from 4 pony set chutes to load out a 25-car train . . . haulage cars are loaded at the discharge end of the conveyor.

Greater Savings Possible

Mine operators can expect even greater continuity with the Hewitt-Robins Ore Mine Conveyor where the mine is completely conveyorized. For there the flow of material would be continuous from stope to surface.

Get the whole story—write for complete information today!

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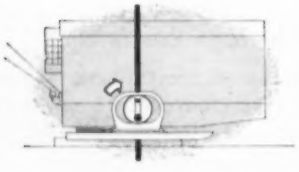
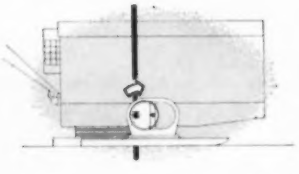
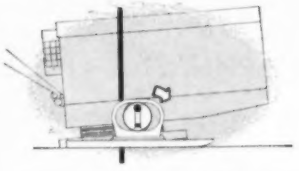


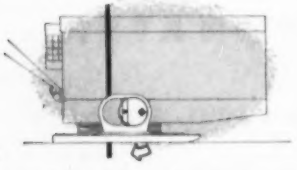
1. Working position. Shoes up — cams in center — guide roller pin at top.



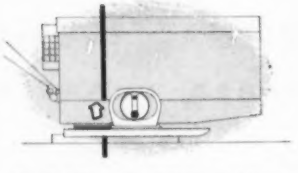
2. Cams rotate — advance shoes and place them on ground.



3. Leading edge of base lifts and skids along as cam rolls to half-way point in rotation.



4. Base is lowered as cams continue to roll.



5. Rotation completed — return to original position.

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WORLD MINING

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COVER CIRCLE: The open stoping method devised by the Peru Mining Company made its Pewabic mine in New Mexico the biggest producer of zinc perman shift west of the Mississippi during World War II.

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GENERAL MANAGER, San Francisco M. F. HOLSINGER
EDITOR ..... GEORGE O. ARGALL, JR.
FIELD EDITOR ..... R. L. BURNS
NEWS EDITOR ..... J. M. TAYLOR
EASTERN MANAGER, Chicago KAREL WEGKAMP
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PRODUCTION MANAGER ..... J. M. STALUN
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DRIFTS AND CROSSCUTS

The Greatest Resource

The report of the President's Materials Policy Commission, the highlights and minerals recommendations of which are summarized in this issue, have already become a highly controversial subject.

Because of the report's likely effect on domestic mining, now, and in the future, *Mining World* will present the appraisal of a group of industry leaders in the September issue.

The most thought-provoking analysis of the report to date was in the June 30th issue of *Barron's*. It concluded: "Instead it (the Commission) became so obsessed with material resources that it all but forgot the vital resource of freedom itself".

Metal Market Stablization

The catastrophic situation created in the mining industry by the frequent and rapid drops in the prices for base metals are well known within the industry. Mines which were forced to close in 1949 when the price of copper dropped 7.5 cents per pound, lead 9.5 cents, and zinc 8.5 cents within a 90-day period were just returning to profitable production when the June collapses in lead and zinc prices occurred.

It is interesting to note that a government commission simultaneously recognized this situation. In its report published June 23rd, the Paley Commission stated as follows:

"Records show that the production of minerals falls off sharply when prices sag; if the prices stay below profitable levels output is curtailed and the labor force drifts away. If the low price period continues long enough, mine maintenance may be neglected, closedowns occur, and the property may ultimately become impossible, or too expensive, to put back into operation. As a consequence of such developments as these, the rate of production will recover more slowly when prices rise again. The operators first will want to be sure that the market will stay up long enough to make it worth their while to undertake expansion of operations especially where reopening is involved. The labor force may have to be rebuilt and neglected maintenance made up for. Some copper mines shut down in the United States in the 1949 recession are only now beginning to produce again."

As a means for maintaining production by increasing the market for lead before further price drops the DMPA has taken action. It will buy 30,000 tons of lead (about 25 days of mine production) at market prices. The lead will be sold, if needed to meet defense production requirements before the year's end. All unsold lead will be turned over to the military stockpile on December 31, 1952.

Jess Larson, chief of DMPA, reported on the lead purchase: "The decision to purchase a reserve supply of lead is based on the considered opinion of agencies responsible for maintaining an adequate supply of vital metals and minerals that future lead requirements for defense uses justify this action."

The mining industry will watch DMPA's action in "supporting the market", no matter for what purpose, with great interest. It may well be a forerunner for similar zinc purchases.

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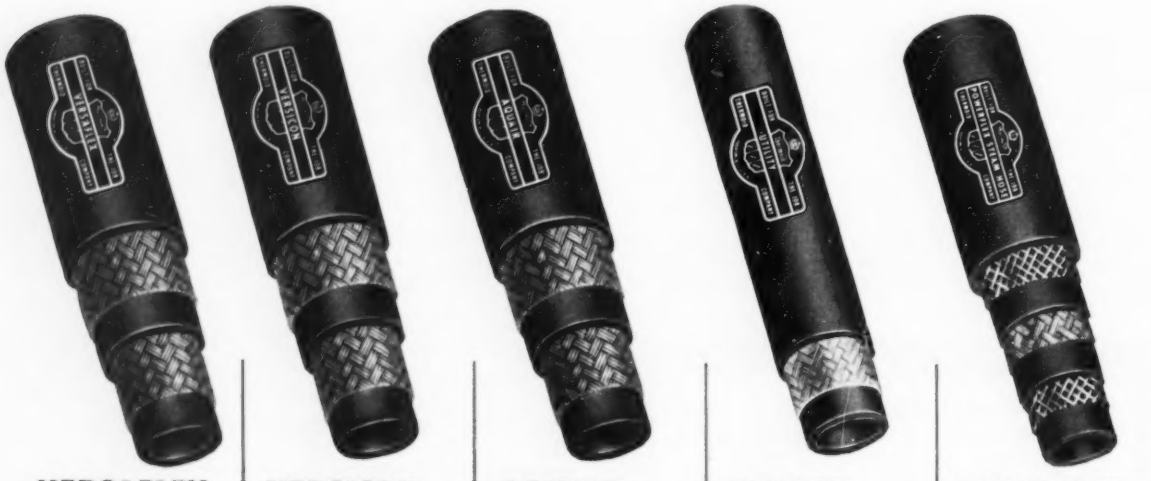

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CAPITOL CONCENTRATES

ZINC PROGRAM BEING RESTUDIED FOR DPA AND BUDGET APPROVAL

Rumor has it that DPA, the agency responsible for approving policy matters and programs, has kicked back to DMPA its request for an extension of the zinc floor price and purchase contract program. DPA apparently has ordered the U. S. Bureau of Mines and the Munitions Board to make independent surveys of the need for zinc now and in the future, versus the presumed production figures for the next several years. NPA also will be asked for an opinion. DMPA was to present a new zinc program for the approval of DPA and the Budget Bureau sometime during July.

In the meantime, several Senators have requested OPS Administrator Arnall to call an agency hearing so that the alleged violations of ore and concentrate ceilings may be thoroughly aired and the operators' viewpoints presented. One of the Senators, Pat McCarran of Nevada, has asked that all court action by the government be suspended until the evidence is in.

• *Strong Mining "Planks" Adopted*

The Republican National Convention has adopted a platform which favors development of natural resources and administration of existing mining laws. Key points include:

"We deplore the policies of the present administration which allow special premiums to foreign producers of minerals available in the United States. We favor reasonable depletion allowances, defense procurement policies, synthetic fuels research, and public land policies including good faith administration of our mining laws, which will encourage exploration and development of our mineral resources consistent with our growing industrial and defense needs.

"We favor stockpiling of strategic and critical raw materials and special premium incentives for their domestic exploration and development."

The plank for gold and monetary policy advocated restoration of "a domestic economy and to use our influence for a world economy, of such stability as will permit the realization of our aim of a dollar on a fully convertible gold basis."

• *Quicksilver Price Takes a Nose-Dive*

Those quicksilver producers who decided not to go back into business, because of the lack of a government support program, now are probably happy they didn't. The foreign producers have knocked the price from $200.00 to $165.00 per flask recently.

• *More Cockeyed Thinking*

The Office of Price Stabilization has approved a 35 percent increase in ceiling prices of wooden mine timbers in western states. Officials explained that "the increase is necessary to relieve a critical shortage which is hampering production of copper and other minerals vitally needed for defense."

Just how increasing costs without increasing ceiling prices is going to stimulate production of metals vitally needed for national defense was not made clear. A 35 percent hike in mine timber prices is a considerable jolt to the western mines. With domestic copper at 24.5 cents against 33.5 cents for copper from Chile, the copper mines of the West which use mine timbers are going to find it harder and harder to stay in business. For lead and zinc mines—which are exclusively underground mines requiring timber—the hike is bound to slow down or cut production.

We wish someone would explain the reasoning of the Office of Price Stabilization.

• *High-Cost Mines May Face Shutdown*

The reimposition of the lead tariff of 1.0625 cents on refined lead and 0.75 cent on the lead content of lead ores and concentrates is permanent unless Congress passes another suspension act. In the meantime the lead market is brick compared with the sales of zinc. Nothing will stiffen the zinc market but the settlement of the steel strike.

Otto Herres, vice president of Combined Metals Reduction Company, observed that producers of lead and zinc face 30 to 40 percent cuts in gross income which means, if the condition continues for any length of time, shutdowns of high-cost mines.

DPA seems in no humor to approve the DMPA request for an extension of the zinc floor price program, though DPA Administrator Fowler has stated that the defense program is only one-half completed and that its rate will be accelerated.

Somewhere along the line the gears are out of mesh, as usual!

• *Information On U. S. Treasury Gold*

On this page in the July issue a series of questions were asked the U. S. Treasury Department by Senator William F. Knowland of California. The Treasury's answers to the questions are: 1) Treasury receipts of newly mined domestic gold from 1940 through 1951 totalled 26,700,000 fine ounces valued at $936,700,000. No records are available for newly-mined foreign gold purchases. 2) Purchases of foreign gold were valued at $24,348,000,000. 3) Treasury sales of gold for industrial uses from 1936 through 1951 were valued at $553,849,409.62. 4) Receipts of "turned in gold" in 1934 were valued at $2,401,958,131. Negligible amounts since that year with sales of $1,623, in 1951. 5) The Treasury has not bought or sold gold at prices above $35.00. 6) Gold has been sold at higher prices abroad. 7) Most foreign governments have refrained from selling gold at prices in excess of $35.00 per ounce. 8) The Treasury does not impose upon foreign governments conditions regarding sales of gold.

• *Committee Ignored Proposed Amendment*

The amendment to the Defense Production Act, by Senators Murray, Hayden and McFarland, in spite of its distinguished sponsorship, was completely ignored by the Senate Banking and Currency Committee when it put together the committee bill. This amendment would have given specific authorization to make over-market contracts for strategic materials where it is necessary to open new marginal deposits, and was a most valuable measure.

• *Miners' Health Is Good*

Contrary to a belief sponsored by unknowing health workers, no evidence of health damage from radioactivity was found in physical examinations of more than 1,100 uranium mine and mill workers in four southwestern states, reported the United States Health Service. A study by the service, in cooperation with the Colorado public health department and the industry, has been underway in Colorado, Utah, New Mexico and Arizona since 1950.

• *Shutdown of Copper Mines May Occur*

Washington authorities are reported to be fully cognizant of the fact that the copper mining industry is faced with the possibility of a strike in August, such as occurred a year ago. Contracts with the unions expired at the end of June and the Mine, Mill and Smelter Workers Union and the C.I.O. are demanding a wage increase of 25 cents an hour plus numerous fringe benefits, which would greatly increase the cost of production. It is not expected that there will be any strike called while negotiations continue.

When the strike was called in August last year, it involved some 60,000 workers and affected mines, mills and other metal plants in 14 states having 95 percent of the nation's copper capacity from the mine to the final production line.

Fearing that a repetition of this situation might have a crippling effect on defense production, some Washington officials are pushing the plan for the government to acquire a substantial portion of the copper that Chile has accumulated since the beginning of the year.

Those who are sparking this plan favor the acquisition of the copper at the present price of 35.50 cents a pound f.o.b. Chilean ports. The copper would be bought for the national stockpile, but in case of a serious shortage that might endanger the defense program, the President could release the metal from the stockpile. Precedents for such action were established last year when 55,000 tons were taken from the stockpile and in May of this year when an additional 22,000 tons were authorized to be released to meet a growing shortage.

So far there has been no indication that Washington is considering an increase in the 24.5 cent ceiling price of domestically produced copper even though it is advocating that Chilean producers be paid 35.50 cents a pound f.o.b. Chilean ports. One wonders just how domestic mines can be expected to absorb radically increased costs in face of the price situation. Washington must figure that the domestic producers have huge stockpiles of dollars from which to draw.

COMING CONVENTIONS

September 8 through 15, 1952. XIX Session INTERNATIONAL GEOLOGIC CONGRESS, Algiers, Algeria.

September 22 through 25, 1952. WESTERN DIVISION, AMC, EXPOSITION, Shirley Savoy Hotel, Denver, Colorado.

September 23 to 25, 1952. Mineral dressing symposium, INSTITUTE OF MINING AND METALLURGY, Royal School of Mines, London, England.

October 20 through 25, 1952. Mining Congress of SOCIETE FRANCAISE DE METALLURGIE, Paris, France.

November 6 to 8, 1952. FIRST ANNUAL SOUTHWEST MINERAL CONFERENCE, sponsored by the New Mexico Mining Association and the Southwest International Mining Association. Alvarado Hotel, Albuquerque, New Mexico.

December 2, 1952. Annual meeting AMERICAN MINING CONGRESS, University Club, New York, New York.

December 5 and 6, 1952. NORTHWEST MINING ASSOCIATION, annual convention, Davenport Hotel, Spokane, Washington.

The Pewabic mine is Peru Mining Company's oldest New Mexico operation and in the past has accounted for the bulk of Peru's production.

PERU EXPANDS TO REDUCE COSTS

The Peru Mining Company, a subsidiary of the Illinois Zinc Company, is increasing the capacity of its New Mexico mining operations 25 percent

Much of America's industrial strength has been built on the fundamental that increased production leads to lowered unit costs. Operating on this theory during the postwar period of rapidly rising costs with no assurance of similar trends in metal prices, the Peru Mining Company planned a program to increase production 25 percent through exploration, development and plant expansion at its properties near Silver City and Deming, New Mexico.

Coupled with the evolution of a lower cost mining method, this program was designed to effectively reduce the cost per ton of ore handled, thereby more nearly insuring profitable production in the event of unfavorable price fluctuations.

Peru's Past Expansion

The Peru Mining Company, a totally-owned subsidiary of the Illinois Zinc Company, began zinc production in 1928 at the Pewabic mine near Silver City in New Mexico's Central mining district. Later, in the early 1940's, two additional properties, the Copper Flat and the Kearney, both near the Pewabic, were brought into production.

To treat the ores from these properties, the company erected a 300-ton flotation mill at the Peruhill siding of the Atchison, Topeka and Santa Fe Railroad four miles north of Deming, New Mexico. During the World War II the capacity of this plant was increased to 1,000 tons per day to handle Peru's increased production as well as custom ores from other mines in the area.

The Pewabic mine and the Peru mill are operated by the Peru Mining Company. The Kearney mine is operated by the New Mexico Consolidated Mining Company, organized in 1942 as a wholly-owned subsidiary of the Peru Mining Company. The Copper Flat mine of the New Mexico Consolidated Mining Company is not in operation.

The Central Mining district is a part of southwestern New Mexico's high, rugged plateau country with elevations at the mine collars above 6,500 feet. The area is semi-arid with occasional light snowfalls and freezing temperatures during the winter months. Rain is largely con-

The aerial tramway that transfers ore from the Pewabic mine to the Santa Fe siding near Hanover, New Mexico carries 800-pound buckets over a distance of 2,400 feet.

fined to these months and flash floods are not uncommon.

Replacement Deposits

The district is an area of Paleozoic limestones and shales intruded, and folded in some places, by Cretaceous monzonitic porphyries and granitic rocks in the form of sills, dikes, and stocks. Replacement of the limestones by ascending solutions formed large irregular mineralized areas.

The Hanover and Santa Rita intrusives seem to have been the most important ore controls. The Hanover is bordered by iron deposits on the north, productive for many years after the turn of the century, and zinc bodies on the south. The Santa Rita granodiorite stock contains and is bordered by copper ores, now mined from the famous Santa Rita pit, and carries zinc deposits north of the northern contact. A third intrusive, the Copper Flat, shows less extensive mineralization.

Stratigraphic Column

The major ore zones mined from the Pewabic and Kearney are bedded replacement deposits in the Mississippian Hanover (Crynoidal) limestone north of the Santa Rita stock. The youngest stratigraphic horizon in the district is an eroded shale, locally known as the Mountain Home, that is irregular in thickness and absent in many places through erosional and possibly depositional variances. Below this horizon lie the 350-foot Upper Blue (Upper Pennsylvanian) and the 85-foot Middle Blue (Lower Pennsylvanian) limestones separated by the Hanover diorite sill, 75 feet thick.

The Middle Blue limestone is underlain by a thin member, the Parting shale, that contains an intrusive known as the White Sill. The Parting shale is in turn underlain by the Hanover limestone, over 100 feet thick. The entire series of sediments show a general dip of 15 degrees to the south.

Mineralization

The ascending mineralizers that formed the identified commercial deposits followed steeply dipping faults in the Hanover limestone, the Parting shale and the Middle Blue limestone. Replacement was most complete in the Hanover limestone where rich ore zones have been found to extend over 100 feet vertically. Above this horizon the mineralized zones are of lower grade but at the Pewabic are quite extensive. Minor amounts of the depositing solutions passed through the Hanover sill to form lean shoots in the Upper Blue and gossan areas at the surface, the only surface expression of mineralization. All known ore zones have been found almost vertically, though several hundred feet, beneath these gossans.

Though the area is cut variously by post- and pre-mineral faults, dikes and small stocks, little or no displacement was caused. The important ore minerals are sphalerite, marmatite, and galena. Mill heads from the properties average somewhat over 6 percent zinc, less than 0.5 percent lead and show traces of silver and copper.

Exploration by Drilling

The Peru Mining Company has long used churn and diamond drilling for development and mining control. The Kearney deposits are well outlined by surface drilling before mining began and in both the Kearney and Pewabic a schedule of underground exploratory drilling is maintained with three to four air-driven diamond drills operated by trained company personnel.

The company has undertaken exploration work under a DMA contract to explore in depth the area northeast of the Kearney. The work includes 4,000 feet of drifting, more than 2,000 feet of surface diamond drilling, more than 5,000 feet of underground diamond drilling, and 1,500 feet of churn drilling. The total program is estimated to cost $225,000 with 50 percent government participation. The work is to be completed during the summer of 1953.

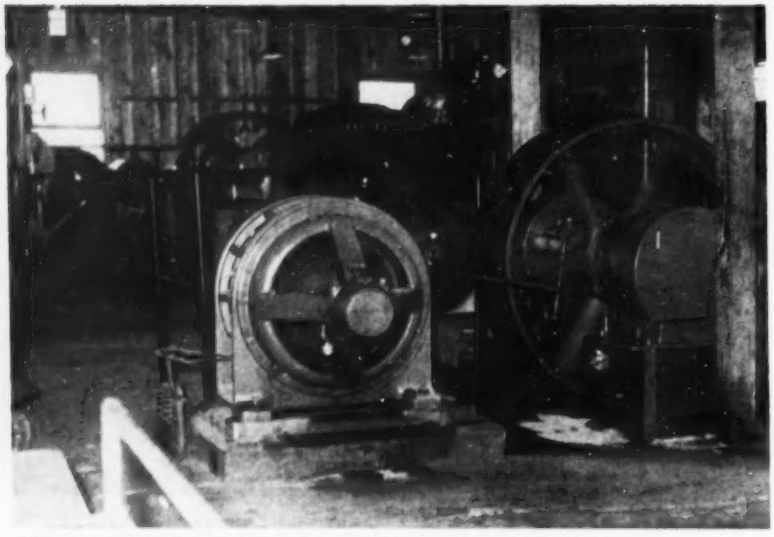
Sprague and Henwood, Inc. is completing the surface diamond drilling portion of a Peru-DMA contract for exploration northeast of the Kearney. The Sprague and Henwood rig (here operated by Charles Hobbs) is under the direction of the contractor's foreman, Hugh Grogg.

Ore Zone Development

After the location of mineralized zones has been determined by drilling, exploration-development drifts and raises are driven to determine the grade and extent of the ore occurrences.

The ore shoots outlined in the two mines are irregular both vertically and laterally, downgrading to lean areas on all contacts thus requiring assay limits in stoping. Since neither the ore nor the country rock require local support, a form of open stoping was indicated as the most efficient form of extraction.

The Kearney mine was developed and is now operated by Peru's subsidiary, the New Mexico Consolidated Mining Company. This operation is being expanded by diamond and churn drilling and a long exploration-development drift into virgin ground northeast of the mine.



Compressed air for the Kearney mine is furnished by three 1,400-cubic-foot compressors—one Union Steam Pump Company unit and two Ingersoll-Rand units.

Two systems of mining were tried —one, benching and overhand stoping; the other, underhand stoping. The former required that broken ore be left in the stopes as mining progressed and proved to be relatively inflexible. The second method satisfied more completely the requirements of quick ore removal and flexibility.

Development of the underhand stopes is relatively simple and often satisfied by the exploration openings. From a haulageway driven under the area to be stoped, a raise is carried to the upper assay limit of the ore shoot at the center of the stope. To reduce to a minimum the amount of timbering required for access and yet provide gravity transfer of the broken ore, the raises are carried at an angle of 65 degrees. The upper section of the raise is roomed out as the initial stoping bench. Ingersoll-Rand 38, and 58 stopers carrying insert bits are used in driving and rooming out these raises.

Stoping Method

When room permits, this bench is advanced with Ingersoll-Rand DA-30 drifters and insert bits drilling horizontal holes. As the upper stoping level advances, lower benches are formed by slabbing toward the central raise with vertical holes drilled with Ingersoll-Rand and Gardner Denver sinkers. Access in the raise and from the raise to the benches is provided by short steels (shanked starters, short lengths of discarded pipe, etc.) protruding from the ore faces.

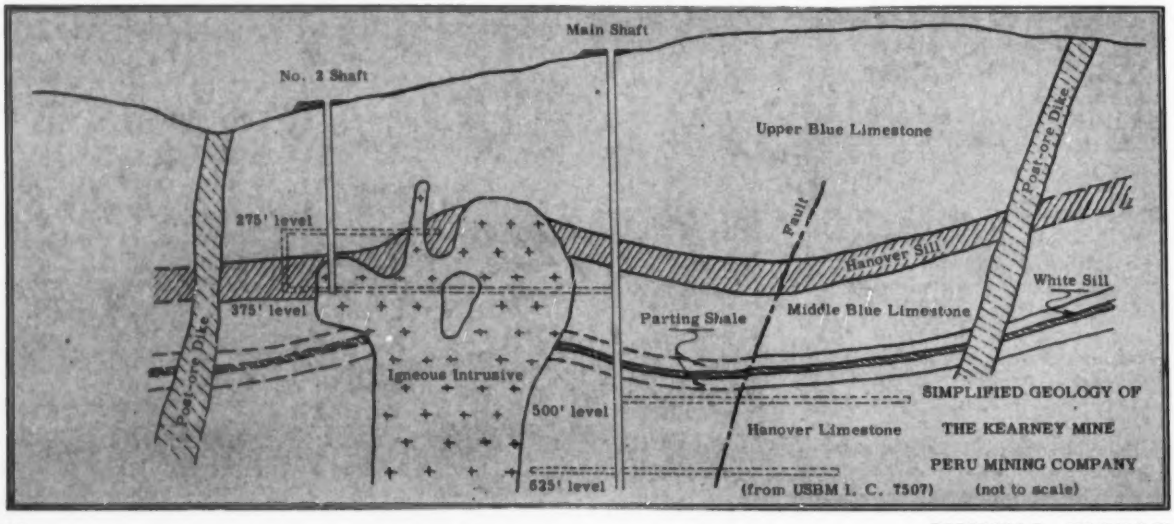
Ore is moved to the haulage level below by gravity until the stope nears completion. As the lowest bench is advanced, slushers are used to move the ore to the raise for gravity transfer to the haulage level. Chutes were originally used to load ore cars but were found to be expensive and difficult to maintain. The raises instead are roomed out at the haulage level and mucking machines load the broken ore into cars for transfer to the station. At the Kearney the loaded cars are trammed to the shaft and then are hoisted; at the Pewabic the ore is dumped into shaft pockets for skip hoisting.

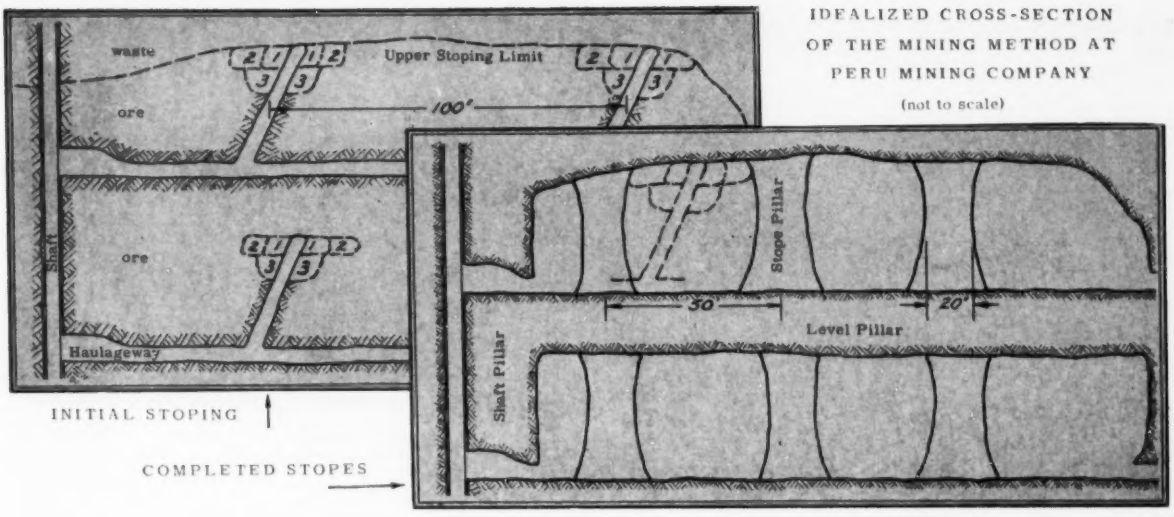
Variations

The central stope raises are spaced at 100-foot intervals to provide optimum slushing distances. Where ore zones extend vertically over distances greater than safe single-stope mining permits, two or more stopes separated by level pillars are used. When both lateral dimensions are great, vertical pillars with 20-foot diameters are left at intervals of 50 feet. These pillars, as well as level pillars, are later pulled for complete extraction.

Pros and Cons

The advantages of the mining method used are: (1) flexibility—horses of waste can be left as pillars without changing the system, ore stringers can be easily followed where slushers are used, and the same general method can be applied to ore bodies of any dimensions; (2) low cost—little or no timber is required for manways, raises, chutes, stagings, etc., working faces are cleared of broken ore largely by gravity leaving maximum shift time for drilling and loading, and development work is reduced to a minimum; (3) safety—the back is cleaned down as the upper bench progresses and back slabbing is slight through the use of horizontal





IDEALIZED CROSS-SECTION OF THE MINING METHOD AT PERU MINING COMPANY (not to scale)

holes on the upper level; (4) immediate ore removal; and (5) simplicity—a minimum of supervision is necessary and the bulk of the ore is broken by simple jackhammer drilling so that production is not wholly dependent on highly skilled miners.

Disadvantages include: (1) lack of ore storage—ore must be removed from the stopes to provide room for drilling and blasting; (2) no local support—timber supports cannot be used though, if necessary, roof bolts could be used as the upper bench advances; and, (3) the difficulty of changing methods—cut and fill or square set methods could not be used once the stope has started. These disadvantages are of little importance at the Peru properties, however, since they all apply to weak ground conditions, not met in the Pewabic or Kearney.

The Peru open stoping method as used during World War II enabled the Pewabic to produce more zinc per man shift underground than any other mine west of Mississippi.

The Pewabic Mine

The Pewabic, one-half mile east of Hanover, New Mexico, is Peru's oldest operation in the district and until recently supplied the bulk of the ore produced by the Company. It now produces on the average of 400 tons per day. Ore is hoisted in 2.5-ton skips to a 450-ton headframe ore bin. From here it is fed to an 18- by 30-inch Allis-Chalmers jaw crusher set at six inches. The crushed material is belt-conveyed to the head of a 2,400-foot aerial tramway for transfer to a Santa Fe siding near Hanover. The Pewabic shaft is down 500 feet. The lowest working level connected to the shaft is at 440 feet. An incline to the southwest opens up a lower level at 570 feet.

The Kearney Mine

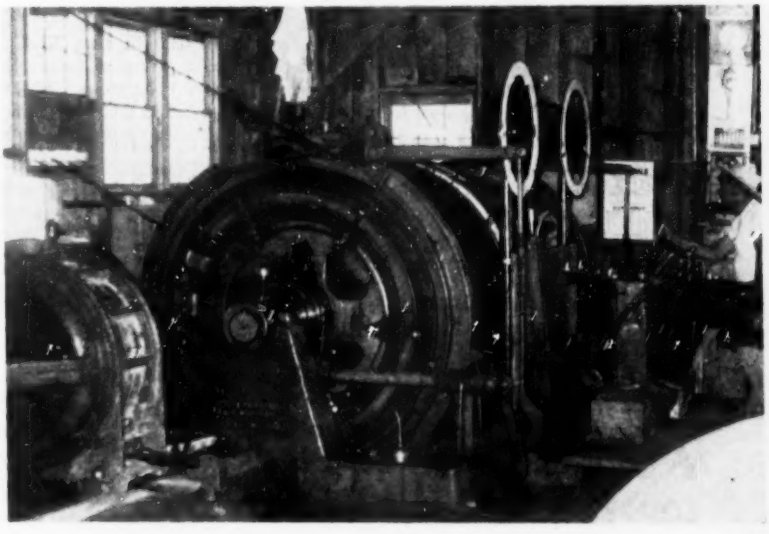
Ore from the Kearney, one-half mile south of the Pewabic, is hoisted to the surface in the one-ton end dump cars used for underground tramming. Present production is 400 tons per day, to be increased when the new addition to Peru's mill has been completed. Hoisted cars are trammed to a 24- by 36-inch Traylor jaw crusher set at 3 inches. Crushed material is belt-conveyed to a 500 ton ore bin from which it is trucked one and three fourths miles for rail shipment over the Santa Fe railroad to the Peruhill mill.

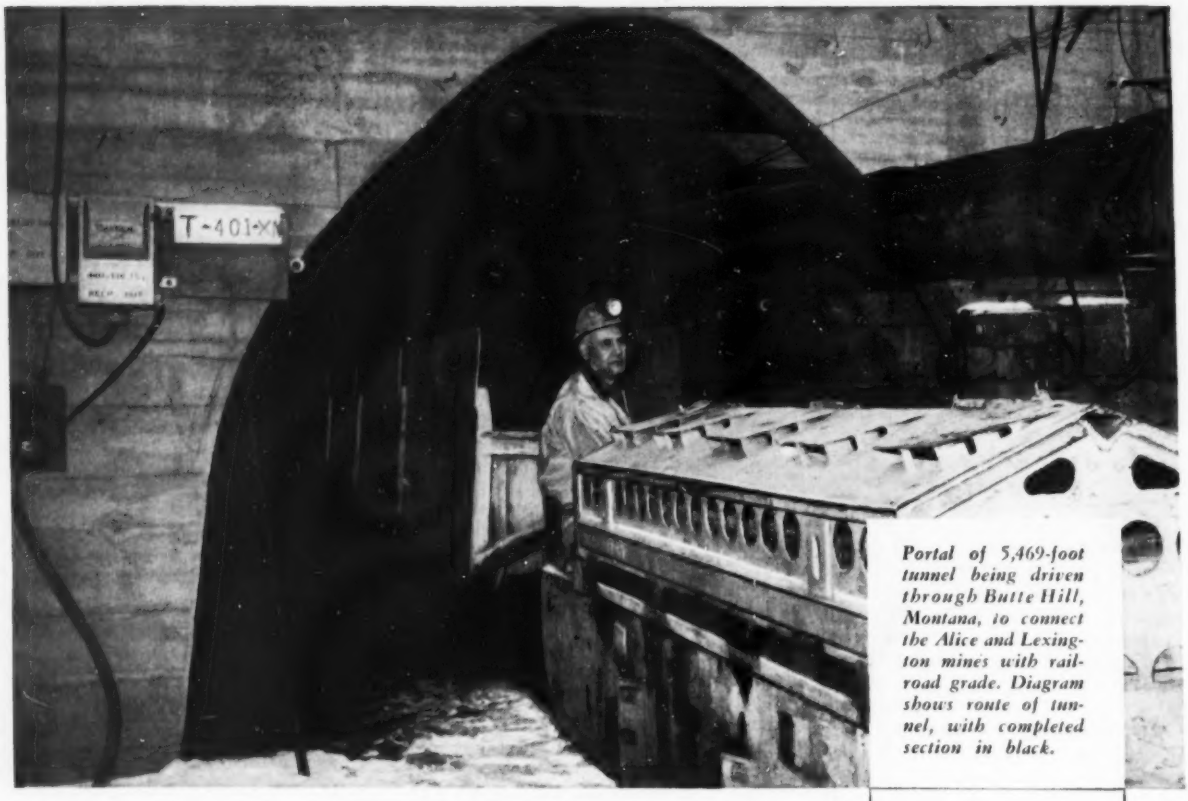
The Kearney has two shafts, the number one and the number two. The sump at the number one shaft is now at 630 feet with the 625 the lowest working level. The number two shaft is 375 feet deep and is connected to the number one at this level. Additional ventilation is afforded by a 12-inch churn drill hole from the surface to the 500 level. A blower at the surface provides forced downcast air travel.

Management

The Peru properties are under the direction of Morris Blumberg, president, 630 Fifth Avenue, New York; Lawrence R. Berkey, vice president and treasurer, 2959 West 47th Street, Chicago; Joseph H. Taylor, vice president and general manager, Silver City, New Mexico; Jerry W. Faust, assistant manager; S. T. McBee, mill superintendent; Wallace Dow, Pewabic mine foreman and John P. Brown, Kearney mine foreman.

Men, material, and loaded ore cars are hoisted through the Kearney shaft by this Wellman-Siever Morgan double-drum hoist gear-driven by a 150-hp. General Electric motor.





Portal of 5,469-foot tunnel being driven through Butte Hill, Montana, to connect the Alice and Lexington mines with railroad grade. Diagram shows route of tunnel, with completed section in black.

Digging into YESTERDAY

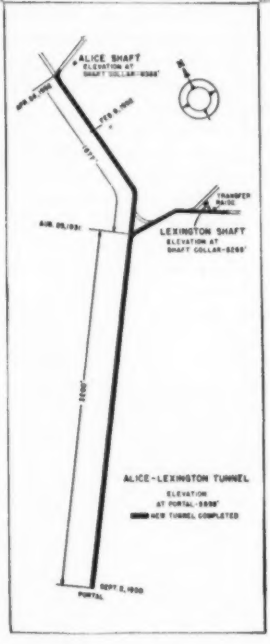
for more ZINC today

Anaconda's historic Alice and Lexington mines on Butte Hill were rich in silver 75 years ago. Today they are being mined for their wealth of zinc—as part of Anaconda's program to increase the capacity to produce from the Company's own mines. The new tunnel, which is now nearing completion, links the two shafts to railroad grade and greatly facilitates the mining operation through improved ore handling.

To handle the increased ore production from the Butte district, the Company is expanding its concentrating and electrolytic plants at Great Falls and Anaconda, Montana. This expansion includes installation of additional crushing, milling and flotation equipment—added leaching units—and new Cottrell treaters to reduce dust losses at the zinc roasting furnaces.

In 1951, Anaconda turned out 62% of all electrolytic zinc—and 23% of all slab zinc—produced in the United States. Within the next few years, the Company's accelerated zinc program will increase Anaconda's mine output capacity by an estimated 50%.

This zinc story is just one part of Anaconda's continuing program of expansion, improvement and modernization—at mines, mills and fabricating plants. Today the program is producing more metal and finer metal for America's strength. Tomorrow it will mean better products and better living for America's people.



ANACONDA'S FAMILY OF METALS
Copper, zinc, lead, silver, gold, platinum, cadmium, vanadium, selenium, manganese ore, ferromanganese.

ANACONDA
COPPER MINING COMPANY

Anaconda Sales Company
The American Brass Company
Anaconda Wire & Cable Company
International Smelting and Refining Company
Andes Copper Mining Company
Chile Copper Company
Greene Cananea Copper Company

INTERNATIONAL PANORAMA

LONDON—Mazapil Copper Company, Ltd. has accepted an offer from the American Metal Company to cooperate in an exploration program to determine the best methods of developing Mazapil's Mexican mining properties.

RIO DE JANEIRO—Companhia Industrie e Comercia de Minerios expects to be mining the manganese deposits at Macapa, Brazil, by the end of the year. Part of the output will be sold to Bethlehem Steel Company under a recent contract.

TORONTO—The United States Steel Company, through its subsidiary the Oliver Iron Mining Division, is reported to have taken options on 5,400 acres of Canadian land near Simcoe, Ontario, to drill for iron ore.

WASHINGTON—The Defense Materials Procurement Agency has agreed to buy 63,000,000 pounds of refined copper from Campbell Chibougamau Mines Ltd. of Montreal, Canada, by the end of 1956.

NEW YORK—Stockholders of St. Joseph Lead Company have approved an amendment to the company's certificate of incorporation extending the purposes and power of the company to include oil, natural gas, and mining operations of all kinds.

HOLDEN, WASHINGTON—The DMPA has granted the Howe Sound Company a bonus of 4.7 cents a pound over-the-ceiling for 8,834,000 pounds of electrolytically refined copper to be produced from Holden mine ores.

WASHINGTON—The United States Congressional Joint Committee on Atomic Energy has reported that military leaders are not devoting a large enough share of defense funds to production of atomic raw materials, especially low-grade domestic ores.

TOWNSVILLE, AUSTRALIA—During the first seven months of 1952 Mount Isa Mines, Ltd. shipped 40,000 tons of silver-lead bullion, zinc concentrate, and lead dross to England, Europe, and the United States.

KLERKSDORP, UNION OF SOUTH AFRICA—The first bar of gold has been poured at the plant of the Stilfontein Gold Mining Company, Ltd. A uranium recovery plant is under construction.

MONTREAL—The Aluminum Company of Canada is expanding its magnesium plant at a cost of $2,000,000. Plant capacity will be raised from 3,000 tons annually to 4,000.

PITTSBURGH—The Defense Production Administration is planning to replenish the aluminum stockpile with 31,000,000 pounds of metal in the fourth quarter of 1952. The equivalent amount of aluminum was withdrawn in late 1951 and early 1952.

WASHINGTON—The Office of International Trade has relaxed export controls on soft pig lead and slab zinc. Export licenses are still required but quotas have been removed.

JOHANNESBURG—Production of Rand gold ore—5,104,500 tons in May—was the highest for any month in 1952. Production costs were 33s. 4d. ($4.69) per ton.

WASHINGTON—The DMPA will buy 30,000 tons of lead at market prices before the end of 1952. If demand for lead increases it will be sold for civilian use, if not sold by year's end it will become part of strategic stockpile. Buying at this time is designed to prevent loss of domestic mine production.

SALISBURY, SOUTHERN RHODESIA—Production of beryl during the first quarter of 1952 was 267.48 tons compared to 248.08 in the same 1951 period.

IVIGIUT, GREENLAND—Kryolitselskabet Oresund A/D is increasing the mine output of cryolite by 19,000 long tons per year. The increased output will be sold to the DMPA for $260 per short ton.

SPOKANE—Engineers of the Kaiser Aluminum Corporation have developed a process for casting high-strength aluminum ingots eight feet long, 32 inches in diameter and weighing 8,000 pounds. The ingot is solid, gas-free, and will be used for gigantic airplane forgings.

WASHINGTON—Military requirements for elemental phosphorus in the fiscal year 1953 will be 22,000 tons. Concentrated superphosphate fertilizer demands by 1955 are estimated at 3,485,000 annual tons. This is 1,400,000 tons above the 1951 consumption.

BOULDER CITY, NEVADA—Final equipment has been installed at the 1,200-ton-per-day manganese plant of Manganese Inc. First operation is scheduled for August.

QUEBEC CITY—Quebec American Zinc Refining Company plans construction of a $12,000,000 zinc refinery in Chicoutimi, about 140 miles northeast of Quebec City.

WALLACE—Polaris Mining Company and Silver Summit Mining Company will be merged if stockholders approve. Under reorganization Polaris would supply 96 percent of the working capital, a mill, and surface plant. Silver Summit would contribute a deep shaft and unexplored ground.

LONDON—The British Iron and Steel Federation has drawn plans to expand steel output from 16,000,000 to 20,000,000 annual tons by 1957. Estimated cost is $840,000,000.

WASHINGTON—The Defense Production Administration has set an expansion goal for bauxite at 8,000,000 long tons in 1953. This is 3,300,000 tons above the 1951 supply.

MANILA—Consolidated Mines, Inc. has placed its new ship loading conveyor in operation. The 1,200-foot-long conveyor will increase chrome ore shipping capacity from 30,000 to 50,000 tons annually.

BERLIN—The National Lead Company has acquired full ownership of Titangesellschaft which operates the largest titanium dioxide plant in Europe at Leverkusen. National Lead previously had owned 50 percent of the company.

DARWIN, AUSTRALIA—Development of the recently discovered Rum Jungle uranium district is reported to have indicated a radioactive area one mile long and one-half mile wide.

Atomic Committee Urges Greater Uranium Output

A very substantial revision in both uranium and thorium procurement goals would promote the common defense and security of the United States, according to the Joint Congressional Committee on Atomic Energy.

In a report to Congress, the committee, headed by Senator Brian McMahon, questioned the theory that supplies of uranium and other atomic materials were so scarce that production goals must be held down. They recommended that "a more vigorous research program is needed to seek out all opportunities for obtaining uranium where it appears only in diffuse amounts," and further stated that the "military leaders are not devoting a large enough share of defense funds to production of atomic raw materials, especially low-grade domestic ores." They urged the military to press for discovery and production of uranium.

MSA Program May Force Philippine Gold Closings

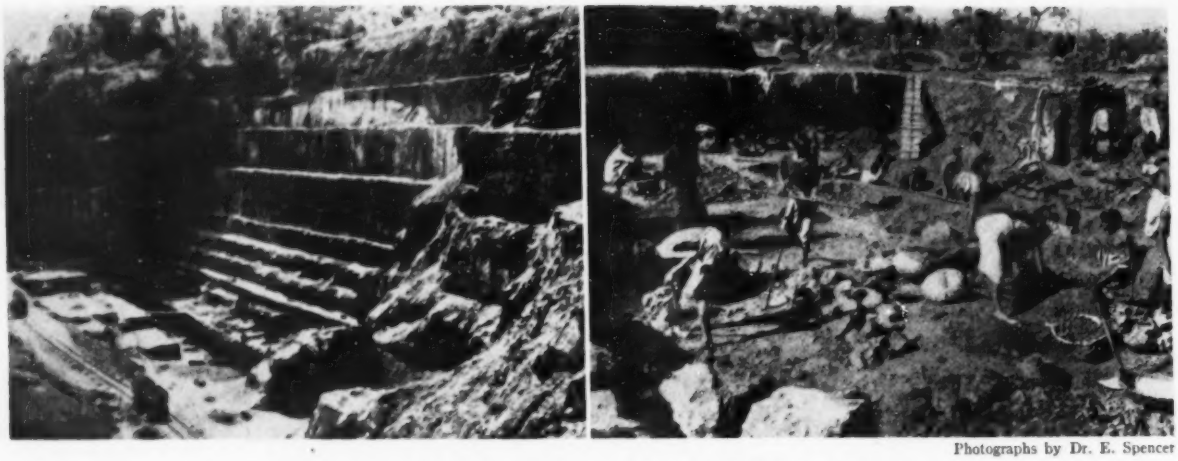
Three of the Philippine's largest gold mining companies—Mindanao Mother Lode Mines, Inc., Benguet Consolidated Mining Company, and Balatoc Mining Company—claim that they would have to shut down if forced to increase miners' wages 25 percent. The companies have petitioned the Wage Board to extend the current pay scale beyond the August deadline set by the Philippine minimum wage law. The law was passed by the Philippine Congress as part of the United States Mutual Security Agency's aid program.

Cerro de Pasco Considers Entering Oil Business

Stockholders of Cerro de Pasco Corporation are considering the possibility of engaging in the oil or natural gas business, if, and when, suitable opportunities become available. The firm reports that it has no contracts for such arrangements but is merely broadening its scope. Cerro de Pasco has mines in Peru from which it produces zinc, lead, copper, silver, and other metals.

Oliver Options Canadian Land for Iron Ore Drilling

The Oliver Iron Mining Division of the U.S. Steel Company has taken options on 5,400 acres of land near Simcoe in Ontario, Canada to drill for iron ore. The options run until 1954 and owners of the property are said to have received $500,000 for them, with a possible $5,000,000 in store if the options are exercised. Exploration work is now being started.



Photographs by Dr. E. Spencer

LEFT: An Indian manganese mine where high-grade ore is removed in a series of benches similar to those in a rock quarry. RIGHT: Concretionary manganese ore is dug, hand-sorted, and screened by men and women at this Indian mine.

INDIA UPS MANGANESE PRODUCTION TO SUPPLY "FREE WORLD" MARKET

Since India first began to produce manganese ore at the beginning of this century, she has vied with Russia for number one position as leader in the world's output. Today, she is supplying the needs of the Free World for this vital material as Russia has stopped exports.

Geology of the deposits

India's deposits are mostly of the bedded sedimentary type, belonging to the Archean period. There are also "lateritoid" types. These are segregations of manganese minerals from the underlying rocks. Such a deposit is concretionary and resembles laterite, hence the term "lateritoid" given by Fermor.[1]

The original Archean sediments contained a high proportion of manganese, further enriched either by the leaching away of the non-manganiferrous minerals or by the deposition of manganese by ground waters. Whether the manganese was deposited as an oxide or as a carbonate which was subsequently oxidized has not been determined, but since there is no indication that it was deposited as a carbonate, it is, therefore, presumed that the original sediment was an oxide. The sediments were subsequently subjected to metamorphic processes. Piedmontitephyllites were formed from manganiferrous shales and the richer beds were converted into pyrolusite (MnO_2) ore. The rocks formed a distinctive group and Fermor termed this group the "Gondite series." It is characterized by various manganiferrous silicates, the chief among which are spessartite ($Mn_3Al_2Si_3O_{12}$) and rhodonite ($MnSiO_3$). The manganese minerals formed were braunite ($3\ Mn_2O_3 4\ MnSiO_3$), sitaparite, ($9\ Mn_2O_3 4\ Fe_2O_3 MnO_2 3\ CaO$) and hollandite, [$m(Ba,Mn)_2MnO_5 + m\ Fe_4(MnO_3)3$]. Prolonged subsequent weathering altered the metamorphosed manganese ores to psilomelane ($H_4R_2Mn_5O_{20}$) pyrolusite. Spessartite and rhodonite of the gondite series were also altered to psilomelane and pyrolusite. The various stages of alteration can be seen in the field. The continuity of the orebody has been maintained to a depth of 350 feet at the Bharweli deposit at Balaghat and indications are that the ore continues to a much greater depth.

Manganese ores are also asso-

One of the open-pit workings of the Bharweli mine. Native labor is used to carry the ore to the one-ton mine cars.

1. Fermor L. L.: *Manganese ore deposits of India*, Mem. Geol. Surv. India, XXXVII, 1909.

ciated with another characteristic group of rocks, known as the "Kodurite series." This series is developed in the Vizagapatam district of Madras state in the eastern part of India. These rocks range from very acidic (quartz-orthoclase) through basic (Kodurite) to ultrabasic varieties (spanditerock and manganese pyroxenites), according to Dunn[2]. Weathering has completely altered these rocks. Fermor has suggested that the Kodurite series may have been produced by assimilation of manganese ore and manganese-silicaterocks by an acidic igneous magma. The ore minerals are mostly psilomelane and pyrolusite, with some braunite, manganmagnetite, and a mixture of jacobsite [$(MnFe)_2O_4$] and hausmannite (Mn_3O_4).

In Singhbhum and Keonjhar, manganese was originally dispersed through Archean phyllites and later segregated as veinlets and lenses of psilomelane-pyrolusite. Such ore deposits are not extensive in length or width, nor do they extend in depth but a large number are scattered over a wide area.

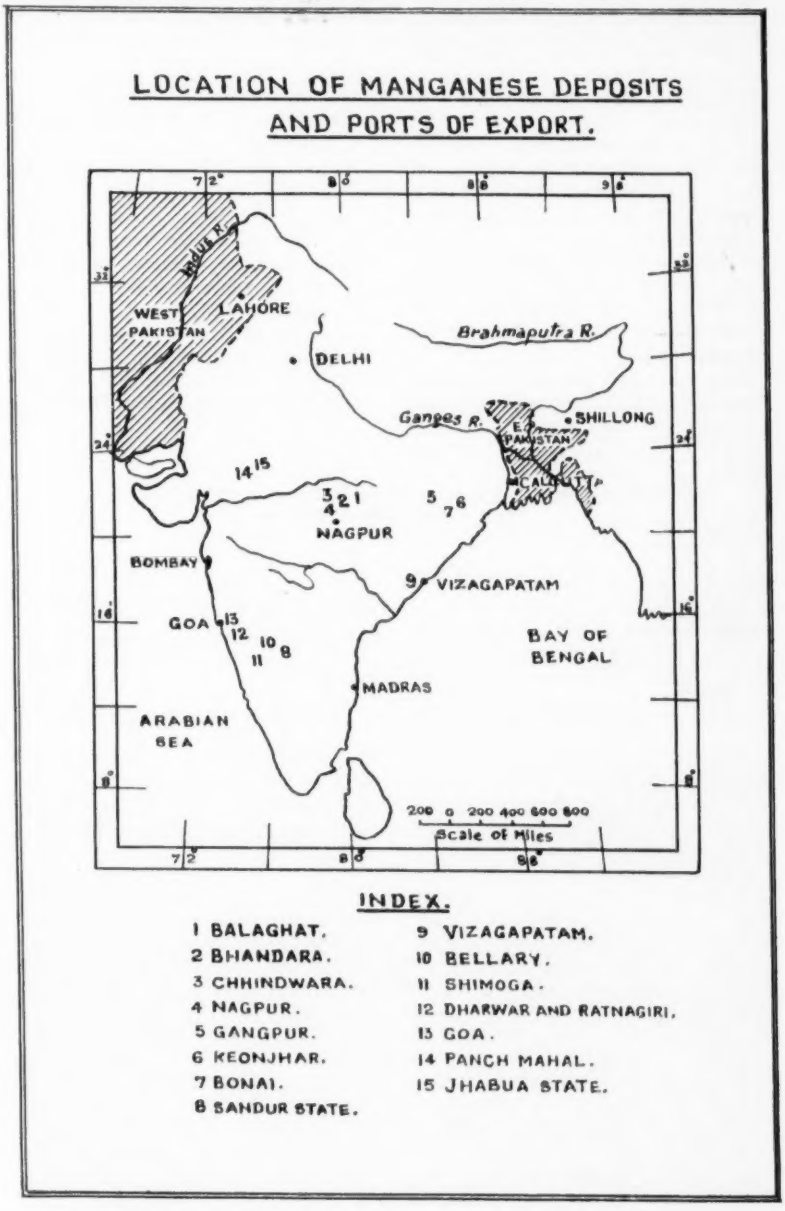
Geographical distribution

The manganese ore deposits are distributed throughout the peninsular region of India. The chief mining centre is the Madhya Pradesh (known as the Central Provinces before 1947). The mines are in the Balaghat, Bhandara, Chhindwara, and Nagpur districts. The orebodies are lenticular masses intercalated in quartz ites, schists, and gneisses. At many places, the ore grades both laterally and along the strike into the members of the gondite series. The orebodies are frequently well-bedded and parallel to the strike of the enclosing rocks. They have been considerably folded at places, along with the enclosing rocks. The Balaghat deposit of the Bharweli mine, which is the largest in the country, extends continuously over a length of 8,800 feet. The ore-bearing formation running through Tirodi is exposed for nearly six miles, though not continuously. The thickness of the deposit varies from eight to 50 feet. However, in some places the formation appears to be about 80 to 100 feet thick, due to repetition by folding. The depth to which the formation goes has not been determined. The present workings have revealed that deposits extend to at least 400 feet below the outcrop.

Gangpur, Keonjhar, and Bonai comprising the Eastern states are second in importance. The ores of Gangpur are related to the gondite series and are similar to the Balaghat ores in quality. Ores of Keonjhar and Bonai are distributed irregularly as lateroids. Numerous small surface deposits are widely scattered in this region. These ores are metallurgical and chemical grades. The former, high in iron, contains 35 to 50 percent manganese, while the latter, low in iron, contains 81 to 88 percent MnO_2 and is used in the manufacture of batteries.

Psilomelane and pyrolusite occur in several parts of the Chota Nagpur district of Bihar. In Bombay state, the ore occurs in the Panch Mahal district near Shivrajpur and at Bamankua. It is a fairly extensive deposit and has been mined since 1906.

Two districts of Madras, namely Bellary and Vizagapatam, have been good sources of manganese. In Bellary, the deposits are of the lateroid type. In Vizagapatam, deposits are associated with the Kodurite Series, the alteration of which has formed manganese ores. The deposits are very irregular and have no definite strike or dip. The largest deposit (Garbham) in the district is 1,600 feet long and has a maximum thickness of 100 feet. The deposits have been mined since 1896 and have yielded large quantities of ore. Kodur, another locality in the district is 1600 feet long and has a



2. Dunn J. A.: *Manganese Ore*, Rec. Geol. Surv. India, LXXVI, 1942.

Tramway terminal and ore stockpile at the Bharweli mine, Balaghat District, Madhya Pradesh.

ores are mainly psilomelane with subordinate amounts of pyrolusite, braunite, and manganmagnetite. The ores are usually of the second and third grade, characterized by high iron, high phosphorus, and low silica.

Ores have been or are being worked on a minor scale at several other places such as North Kanara, Ratnagiri, Jhabua State, Goa, Chota Udaipur, and parts of Mysore state.

Grades of ore

The ores are graded into three classes based on manganese content as follows: First grade ore over 48 per cent manganese; second grade ore between 45 and 48 percent manganese, and; third grade ore below 45 percent manganese.

Selling prices are determined on accurate analysis. Ores analyzing below 30 percent manganese are usually not marketable. For ferromanganese, only the first grade of ore, containing less than 8 percent SiO_2 and 10 percent Al_2O_3, is used. The Central Provinces Manganese Ore Company, Limited, the largest producer in India, classifies metallurgical ore into two groups—the Oriental grade and the Bawantheri grade. The former averages 51.0 percent Mn, 7.0 percent SiO_2, 7.0 percent Fe and 0.11 percent P while the latter contains 48.0 percent Mn. 7.5 percent SiO_2, 9.0 percent Fe and 0.15 percent P.

For chemical industries, ore that gives off a high percentage of oxygen when treated with acid is required, and such an ore is obtainable from Keonjhar state. Deposits of the first grade ore, containing between 48 to 52 percent manganese, are mainly mined in Madhya Pradesh. The ore is lumpy, contains 4.0 to 7.0 percent, Fe, 3.0 to 10.0 percent SiO_2, 0.1 percent P and low moisture. The second and third grade ore is largely mined in Singhbhum and Keonjhar. The third-grade ore used by steel works contains 30 to 35 percent Mn and about 20 percent Fe.

The major portion of India's high-grade ore is exported. Most of the ore is suitable for metallurgical industries. Indian ores have been tried in dry batteries but results are not good, except with the ore obtained from Keonjhar.

Ferromanganese was first manufactured in India in 1915 and the tonnage is constantly rising. One of the main difficulties is to keep phosphorus low, for which purpose ore from Bharweli (Madhya Pradesh), containing 0.07 percent P, and coke from Giridih, containing 0.022 percent P, are preferred. The analysis of Indian manganese ores exported from the different mines is given in Table No. 1[3].

3. Dunn J. A., Records of the Geological Survey of India, vol. 76, No. 9, p. 20.

Table No. I

Analysis of First- and Second-Grade Manganese Ore Exported By Three Large Indian Producers

Company	*Manganese*	*Percent Iron*	*Silica*	*Phosphorus*
Keonjhar State				
First grade	48 to 50	7 to 8	3	0.075 to 0.15
Second grade	38 to 42	14	4	0.09
Shivrajpur Syndicate				
First grade	50.0	5.0	3.2	0.25
Second grade	46.5	5.6	8.5	0.27
Central Provinces Manganese				
First grade	48 to 54	4 to 10	4 to 11	0.03 to 0.19
Second grade	45 to 50	6 to 12	5 to 12	0.075 to 0.262

Prospecting and Mining

As the manganese deposits crop out on the surface on a fairly extensive scale, prospecting, in the real sense of the term, has not been scientifically carried out. The demand for the ore, however, is increasing and the surface deposits are being rapidly depleted. Consequently, during the past decade, the need for scientific prospecting has increased. The known deposits are very irregular in shape and also discontinuous, with the result that ordinary prospect drilling is of little use. The Geological Survey of India carried out gravitational prospecting in the Nagpur district. Large scale prospecting, employing magnetic and electrical methods, has also been carried out on behalf of the Central Provinces Manganese Ore Company, Limited, with encouraging results in the Balaghat district.

In India most of the manganese ore is mined from open pits. They are shallow in the lateritoid type of ores, while in the hilly region of the Madhya Pradesh and in the Vizagapatam district of Madras they extend to considerable depths. Underground mining, however, is resorted to at the Bharweli mine of the Central Provinces Manganese Ore Company, Limited and at the Shivrajpur

Table No. II

Exports of Indian Manganese Ore From 1937 Through 1951

Year	*Long Tons*
1937	1,151,834
1938	648,740
1939	781,132
1940	727,442
1941	568,880
1942	600,204
1943	712,424
1944	151,621
1945	171,276
1946	479,447
1947	597,677
1948	563,482
1949	613,907
1950	808,221
1951	956,206

Table No. III

Destination of Indian Manganese Exports in 1951

Country	*Long Tons*
United States	481,293
Japan	161,453
United Kingdom	115,800
Germany	61,070
Italy	38,865
France	38,750
Belgium	21,560
Canada	12,974
Sweden	12,128
Norway	6,473
Netherlands	3,090
Yugoslavia	2,750

Table No. IV

Indian Manganese Output in 1950 By Province and District

Province	*District*	*Long Tons*
Bihar		
	Singhbhun	36,326
Bombay		
	Panchmahal	40,754
Madhya Pradesh		
	Balaghat	334,685
	Bhandara	109,922
	Chhindwara	18,176
	Nagpur	119,347
Madras		
	Vizagapatem	30,063
	Sandur	61,733
Mysore		
	Shimoga	501
Orissa		
	Bonai	30,082
	Keonjhar	105,773
	Koraput	6,200
Rajasthan		
	Banswara	8,047
	TOTAL	901,609

mine of the Killick Industries Limited in the Panch Mahal district of the Bombay state.

Mining is carried out mostly by manual labor and hence a large number of men are employed. In Vizagapatam, Mysore, Singbhum, and Keonjhar, labor is easily obtainable, but in the Madhya Pradesh laborers are frequently imported from other sections. To meet sudden demands, the ore has been mined very carelessly in many places without any regard for future workings. It has sometimes been discovered that the waste had been dumped on the hidden extension of the orebody.

Where the deposit is thick, "benches" of convenient height are created in the open pits. If the ore is not hard, it is removed with crow bars taking advantage of the divisional planes in the deposit. For compact rock, drilling is usually done by hand. The big blocks detached after blasting are broken up, heavy sledges and baskets are filled with rocks and natives usually carry these baskets on their heads to the mine cars.

The management of the companies, in order to avoid labor troubles, prefer to give contracts for mining carried out under their supervision. The rates are fixed per 1,000 cubic feet of stacked and cleaned ore and a separate rate is paid for dead work. The number of tons of ore produced annually per person employed in the mine averages about 35 to 40.

Though many of the operations are haphazard at best, the Shivrajpur Syndicate, Limited, the Central Provinces Manganese Ore Company, Limited, and a few other firms have used modern planning in laying out their mines. As an example of the planned operations, the Bharweli underground workings are developed by a 1300-foot adit on the 215-foot level, two four-compartment shafts and winzes on 200-foot centers. Modern mechanization includes locomotive underground haulage and aerial tramming to a central loading station on the surface.

Beneficiation

The Indian ores, because they are pure and contain a high percentage of manganese, do not usually require any beneficiation before they are dispatched from the mines. Some amount of hand sorting is done to remove the foreign matter. The ores are graded by sight, the color being generally indicative of the percentage of manganese in the ore. An HMS plant is now under construction to treat dumps at the Dongri Buzurg mine of the Central Provinces Manganese Ore Company, Ltd.

Underground mining is partially mechanized and caged cars are hoisted to the surface through this vertical shaft at a mine in the Balaghat district. (See No. 1 on Index map).

Marketing and export

Large consumers in foreign countries purchase the ore directly from the producers. Contracts for supply are made for long periods. The chief ports of export are Bombay and Goa on the west coast, and Calcutta and Vizagapatam on the east coast. The ore from the Central Provinces (Madhya Pradesh) is exported from Bombay. The opening of the new port of Vizagapatam has reduced considerably transportation distances to the sea. Vizagapatam has grown in importance for the export of manganese ore and by far the largest amount is now exported through this port. The chief purchaser of the ore is the United States, followed by the United Kingdom. Before the last war, substantial quantities were exported to Germany and Japan.

Table No. V

Production of Indian Manganese in 1950 By Companies

Company and District	*Long Tons*
Central Provinces and Manganese Ore Co., Ltd.	352,405
Central Sandur Mining Co. Ltd.	61,733
Tata Iron & Steel Co.	51,984
Shivrajpur Syndicate Ltd.	40,754
Shyamji Narayanji	31,648
R. B. Seth Shreeram Durgaprasad and Fatechand Narsingdas	29,063
Seth Gopi Kisan Agarwala	31,400
Mangilal Rangta	28,413
Serajuddin & Co.	25,070
Indian Iron & Steel Co., Ltd.	22,838

An open-pit mine in the Jamda-Koira Valley of the Keonjhar-Bonai district. (Numbers 6 and 7 on the Index map.)

Procuring a sample of crankcase lubricating oil from a dump truck with a sample gun. Oil samples are withdrawn daily from all equipment that has been operating continuously and the samples are sent to the oil analysis laboratory.

"QUALITY CONTROL OF LUBRICANTS"

Oliver Iron Mining Division Cuts Number of Lubricants From 65 to 12, Uses Correct Oil In Right Place, and Insures Crankcase Oil Changes as Needed

By Carl Burton
Superintendent of Maintenance
Oliver Iron Mining Division
Hibbing-Chisholm District
United States Steel Company

Mr. Burton's article was originally prepared for the Association of Iron and Steel Engineers. Because of the outstanding success of the lubrication program in Oliver's iron mines the article is published by Mining World for all miners in every part of the world.—Ed.

"Quality Control of Lubricants" is a term used in the iron ore mining business to determine whether a lubricant is suitable for continued use in a piece of mining equipment.

In order to better understand the need for lubricant control it is first necessary to describe the equipment used and second, the conditions under which it operates. Many types of equipment are used to mine iron ore, such as 1,000 to 2,000 hp. Diesel electric locomotives, 300 to 400 hp. 30-ton trucks 15- to 20-ton tractors, 40- to 50-ton Diesel and Diesel-electric locomotive cranes, road patrols, Diesel engine powered shovels up to 5½ yard dipper capacity, electric shovels up to 6½ yard dipper capacity, service trucks, loaders, portable and stationary Diesel, gas and electric air compressors and many other types of powered mechanical equipment. In addition to the mobile mining equipment there are semi-permanent stationary installations for shops, underground mine hoist installations, etc. The majority of the mining equipment operates seven days a week, 24 hours a day. The men are on a 40-hours a week schedule, which means that the equipment is operated by a number of persons during a week. This constant changing of operating personnel necessitates a good control method for lubricant handling and application in order to eliminate the mixing of lubricants and to insure the correct application and renewal of lubricants when required. Another obstacle to be overcome in properly lubricating mining equipment is the operating conditions. The majority of mining equipment is started and operates out of doors in sun, rain, and snow in temperatures ranging from plus 100° F. to minus 60° F.

Lubricants Down From 65 To 12

The lubrication control program now in use by the Hibbing-Chisholm District of the Oliver Iron Mining Division of the United States Steel Company was started by first analyzing the lubrication requirements of all equipment in use and comparing what was required with what was being used. It was first discovered that over 65 different oils and greases were used for winter and summer operation. By evaluating

and consolidating, this number of lubricants was cut to 12 different products. This consolidation of lubricant brands and types has had a three-fold benefit; it minimizes the chance of the mixing of lubricants, it yields a benefit through volume purchasing of lubricants, and it requires less inventory and accounting expense.

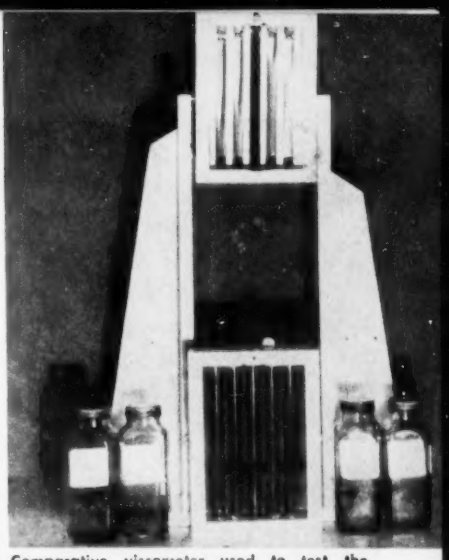
What Lubricants Where

The second step in establishing the controlled lubrication program was to make sure that the people responsible for lubrication knew what lubricant was to be used and where. This educational part of the program was attempted in the following manner. On machinery which presented complicated lubricating problems maintenance engineers were assigned to the job of making schematic charts showing each grease or oil check point and indicating the kind of lubrication, amount per application and the frequency of application required. These charts were posted on the equipment together with a list of the lubricants to be used on the particular equipment. This list is used in ordering lubricants from our central storage point.

A sound slide film was made showing the correct method and the importance of lubricating a particular type of equipment. The aid of the operating foremen in the various mines was enlisted by having meetings at which the cost of improper lubrication was emphasized by citing costs of repair which could have been eliminated on the equipment in their charge by proper lubrication and by showing them the film slide on how and where the lubrication should be done. The workmen directly responsible for the lubrication of machines were then called in and instructed with the film slide, pointing out the costs of faulty lubrication and what was being done to make their job easier. The lubricator's job is being made easier by the installation of the lubrication charts, power greasing equipment, both air and electric barrel pumps with retractable grease hose reels, centralized lubricating systems and better lubricant handling facilities. In some instances, for mobile equipment operating "around the clock," we have provided a lubrication truck, carrying the necessary lubricants, to go to the equipment on the job and aid in the lubrication.

Check Each Engine Daily

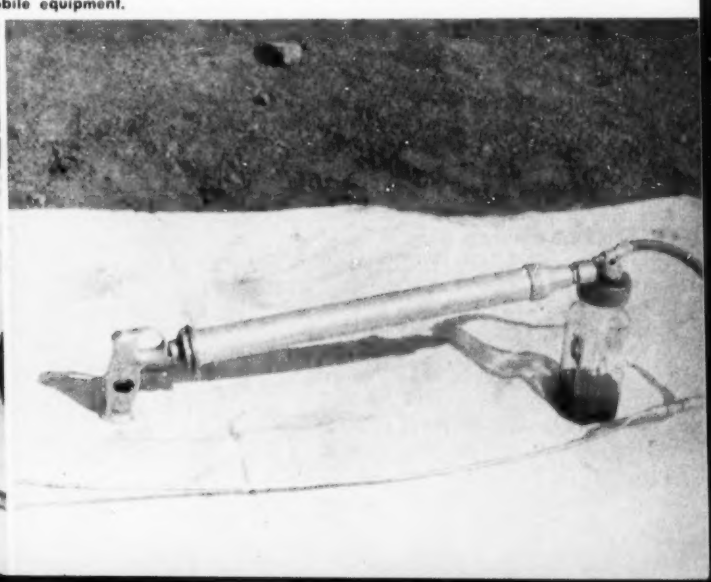
The third phase of the controlled lubrication program involved insuring that the best lubrication was being obtained for the least amount of expense. First, one of the large expense items in our lubricants cost, engine crankcase oil, was checked to determine whether the recommended change period was correct. In order to decide whether the change period for crankcase oil was correct a program was set up to take a sample daily from a representative group of each type of equipment. This sample was then analyzed to determine whether it would meet the minimum specification required for proper lubrication of that particular type of equipment. It was soon discovered that no blanket oil change period could be set up which would cover all engines in any particular type of equipment. The change period recommended by the engine manufacturer is the period that is best for the average engine. It does not mean that if the recommended change period is followed on all of their engines no operating difficulties will be experienced due to faulty lubrication. Some engines may dilute the oil to a dangerous extent, due to faulty injection or poor carburetion, in a relatively short number of hours, while others may develop water leaks into the lubricating system or contaminate the crankcase oil due to engine blow-by or faulty operating temperature. Still other engines may continue to operate for hour after hour and the oil will remain in a "good as new" condition. It seemed reasonable to expect that if a simple check could be made daily of the crankcase oil condition in all engines it would be possible to decrease the oil change frequently and to minimize the danger of losing an engine due to faulty crankcase oil, as well as to extend engine life by reducing wear.

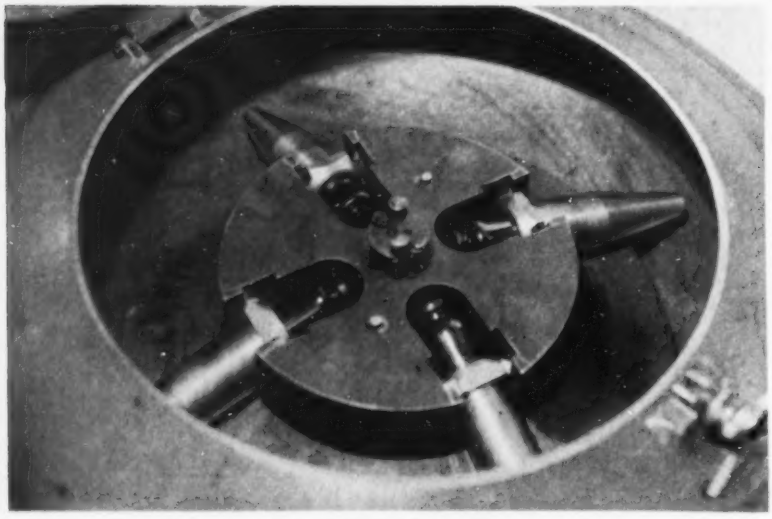


Comparative viscometer used to test the viscosity of oils.

Utilizing the experience of lubrication experts from various oil companies, the following procedure was developed. Oil samples are withdrawn daily from all equipment that has been operating continuously and the samples are sent in to an oil

LEFT: The centrifuge is used to measure the amount of sediment in the oil. RIGHT: Special suction gun developed for extracting lubricant from mobile equipment.





Four oil samples are tested in the centrifuge at one time.

analysis laboratory. The sample of oil is taken by using a special suction gun which was developed for the purpose. Some installations are provided with a pet-cock drain where a representative sample may be taken. However, the sample gun method is preferred because it eliminates the danger of oil loss due to vibration breaking of auxiliaries to the pet-cock drain or loosening of the pet-cock valve. It also avoids contamination of the sample.

Testing Used Crankcase Oil

Two simple checks are then made on the used crankcase oil: the first is a viscosity determination in which a small sample of the used oil is placed in a test tube with a steel ball. This tube is then placed in a rack along with other tubes containing samples of the same new oil of different viscosities. For example, if the used oil being checked was originally a S.A.E. 30 oil, the samples of new oil would be S.A.E. 30, 20, and 10. The falling sphere comparative rack is then tipped over and the dropping speed of the steel ball is noted in comparison with that of the steel balls in the samples of new oil of the different viscosities. The used oil is then rated as a plus or minus 30, 20 or 10, depending on the relation of its viscosity to the viscosities of the samples of new oil.

The sample is then diluted 50 percent with benzine in a specially calibrated tube and is centrifuged in a DeLaval Model No. 100 cc. centrifuge for 12 minutes. After spinning, the percentage of solids, now accumulated in the end of the tube, is noted and recorded. The results of these two simple tests are then recorded on one sheet for comparison. The figures obtained from these two tests for the various samples of used oils are then compared with standard allowable limits of viscosity and sediment which have been established from past experience. The viscosity limit is 10 points lower than the unused oil. For example, if the comparative viscometer indicated that the viscosity of a used oil sample was approximately the same as that of a new S.A.E. 20 oil and the original oil has been an S.A.E. 30, the unit would be allowed to operate. However, if the viscosity of the sample tested lower than the limit, steps would be taken to bring the unit in immediately for an oil change and a check-up. The limits on sediment have been set at 0.6 percent by volume for a truck, tractor, grader, or car engine, and 0.14 percent sediment by volume for a Diesel locomotive or similar unit's crankcase oil. If the sediment in the used oil sample is found to be above the established limits, the oil laboratory calls for a cartridge change in the lubricating by-pass filter. Attempts are being made to standardize on a repackable lubricating oil by-pass filter cartridge in order to lower the cost of a filter cartridge change.

OLIVER IRON MINING COMPANY
DAILY SERVICE REPORT

Date: *7-26-51* Location: *Pillsbury Mine*

Truck No.	Time	Grease Service & Nugent Bag Change	Time	Change Oil Filter	Crankcase Breather Filter Service	Time	Lube Oil Change	Time	Air Filter Change
599		x			x				x
600		x			x				x
486		x							
524				x			x		
401		x			x				x
459				x					

Call sheet data used by the sample tester on which he records work to be done at the Pillsbury mine garage.

Importance Of Records

From the posting sheet, on which all the samples for that day are posted, the laboratory technician posts to an individual unit engine card the results of the sample examinations and the number of operating hours. A call sheet is then made out for each mine, garage or foreman, depending on the condition, using the complete samples posting sheet and the individual engine card sheet as a guide which lists any periodic check to be performed and the necessary measures taken to correct the faulty oil condition.

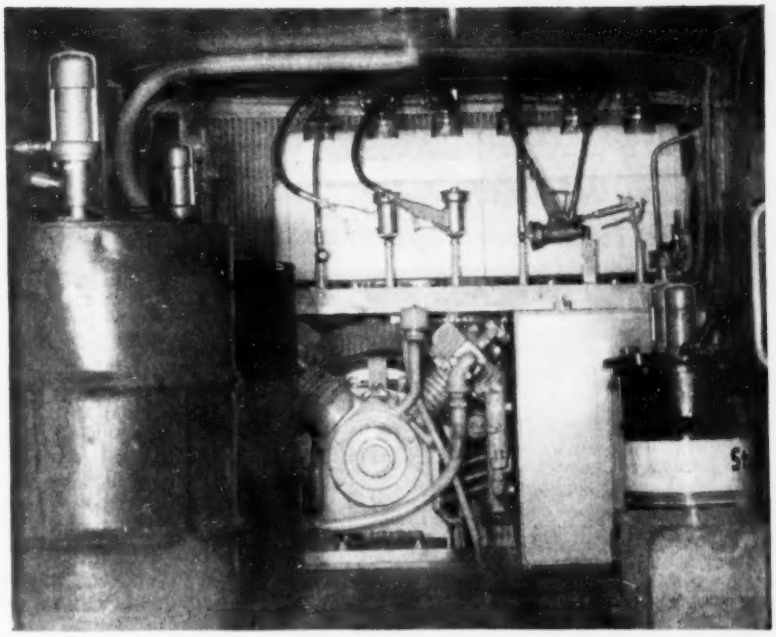
EQUIPMENT RECORD CARD

TYPE OF ENGINE
EQUIPMENT NO. *598* TYPE OF FILTER *Stanalube HLA (test)*

DATE		*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*
VISCOSITY		*30–*	*30–*	*30–*	*20–*	*30–*	*30–*		*30–*	*30–*	*30–*			
SEDIMENT		*.09*	*.15*	*.14*	*.14*	*.18*	*.30*		*.30*	*.27*	*.10*			
CORROSION														
HRS. ON OIL	*337*	*345*	*363*	*375*	*387*	*400*	*416*	*X0*	*8*	*24*				
HRS. ON FILTER	*337*	*345*	*363*	*375*	*387*	*400*	*416*	*X0*	*8*	*24*				
HRS. ON GREASE & FILTER	*31*	*X8*	*26*	*38*	*X12*	*25*	*41*		*X8*	*24*				
HRS. ON NUGENT	*31*	*X8*	*26*	*38*	*X12*	*25*	*41*		*X8*	*24*				
Total hrs. on engine to date	*385*	*393*	*411*	*423*	*435*	*448*	*464*		*472*	*488*				
OIL ADDED DAY (OT)					*6*	*4*	*4*	*7*	*10*	*23*	*7*			
TYPE OF OIL		*26*	*104*	*86*	*82*	*105*	*60*	*82*	*50*	*91*				
TYPE OF FUEL														
REMARKS:														
HRS. ON TRANSMISSION	*385*	*393*	*411*	*423*	*435*	*448*	*464*		*472*	*488*				
HRS. ON DIFFERENTIAL	*385*	*393*	*411*	*423*	*435*	*448*	*464*		*472*	*488*				
HRS. ON TORQUE CONVERT'R														
SCREEN														

EQUIPMENT NO.

Some of the items found on this sheet, that have been previously set up by the foreman in charge of the equipment, are: Grease job (based on operating hours), oil change, oil filter cartridge change, injection system check, check for fuel, water or hydraulic oil or lubricating oil leaks, special filter checks or changes, or any other item the foreman in charge of the equipment may have set-up on an hourly basis. The information from this sheet is then forwarded to the foreman, garage or shop, depending on how the work is to be handled; the work required is completed and the noted sheet is returned to the oil laboratory. Every two weeks the oil laboratory prepares a report that is sent to the lubrication foreman, truck and tractor foremen, locomotive foreman, and superintendent of maintenance. This report contains a two-week summary of the crankcase oil condition of equipment under the supervision of the oil laboratory. The report includes such items as total engine operating hours, operating hours during the period the report covers, crankcase oil added, number of oil changes, number of filter changes, hours on the oil since last changed and hours on the filter since last changed. The report also tabulates the engine crankcase oil consumption in quarts per hour of each engine for a four-month period. This same report tabulates the units that have crankcase oil dilution or high sediment and fuel oil consumption. The report gives the maintenance foreman a very good picture of the engines under his care and allows him to plan for engine change-outs and overhaul in advance. When engines consume one quart or more per hour of crankcase oil, they are changed out or overhauled.



Interior view of the mobile equipment bus which travels to the mines to lubricate tractors and graders that operate round-the-clock.

Program Pays Profits

The quality control of lubrication is one item in a preventive maintenance program which is in effect in the Oliver Iron Mining Division. This program is aimed at increased production with less downtime of equipment and at keeping repair and maintenance costs at a minimum. The quality control of lubricants has had good acceptance by the maintenance foremen because it eliminates clerical work that would have to be done by him or his mechanics, besides giving him a check on engine conditions. The maintenance foremen are now changing-out or overhauling engines based on an oil laboratory report on oil consumption. This means a planned delay instead of a breakdown to the mine operators. How is the expense of such a program justified? It may be stated that the saving afforded the company due to volume purchasing and decreased oil consumption has more than paid for the expense involved in the described program. Decreased engine wear, which means lower repair and maintenance costs and increased mine production, is an additional benefit derived from the program.

LEFT: Typical open pit iron ore mine on the Mesabi Range showing electrical shovel, railroad equipment, and an electrically powered churn drill. "Quality control of Lubrication" for this equipment is continually being improved. RIGHT: Crankcase oil in the off-highway Diesel powered 30-ton pay load truck is sampled daily.

"RESOURCES FOR FREEDOM"

President's Materials Policy Commission Evaluates Minerals Uses & Needs, Estimates 1975 Consumption and Recommends Methods to Prevent Shortages

Resources For Freedom is the title of the long-awaited report of the President's Materials Policy Commission established on January 22, 1951 under the chairmanship of William S. Paley.

A major portion of the more than 1,000,000 word, five-volume report deals with metals and minerals; the findings, forecasts, and recommendations can have an important bearing on every mining operation in the world.

The report attempts to forecast what the United States will look like in 1975, and how and where the resources needed at that time will come from. The commission chose 1975 as the key year because they felt it was soon enough to rule out any vast shifts. For instance, the use of atomic power for the generation of electric power is not likely to play an important role in 1975.

What the U. S. Will Look Like

The population will be 193,000,000 with a labor force of 83,000,000. There will be 65,000,000 automobiles on the road, compared to 39,000,000 in 1950. Homes will increase from 43,000,000 to 62,500,000. Aluminum consumption will increase 358 percent; copper, 43 percent; petroleum, 110; fluorspar, 187; tungsten, 150; nickel, 100; iron ore, 54; zinc, 39; and tin, 18 percent.

The Commission's report does not overlook the possibility of war in this period but neither does it assume war. War would alter the patterns of materials demand and supply in swift and drastic ways; yet if permanent peace should prevail, and all the nations of the world should acquire the same standard of living as our own, the resulting world need for materials would be six times present consumption. In considering materials at long range, therefore, we have roughly the same problems to face and actions to pursue, war or no war.

Danger of Real Costs

Absolute shortages are not the threat in the materials problem. We need not expect we will some day wake up to discover we have run out of materials and that economic activity has come to an end. The threat of the materials problem lies in insidiously rising costs which can undermine our rising standard of living, impair the dynamic quality of American capitalism, and weaken the economic foundations of national security. These costs are not just dollar costs, but what economists refer to as real costs—meaning the hours of human work and the amounts of capital required to bring a pound of industrial material or a unit of energy into useful form.

Technology Must Contribute

Modern science and technology face heavy responsibilities in answering the materials problem. Technology has had two opposite effects on materials: it has greatly increased the efficiency of their use but it has also greatly increased the drain on the resources from which

The Commission Members—

LEFT: William S. Paley, chairman. B. S. in Economics, Wharton School of Finance and Commerce, University of Pennsylvania, 1922. President, 1928 to 1946, and chairman of board of Columbia Broadcasting System from 1946 to date. LEFT CENTER: George R. Brown. E. M., Colorado School of Mines, 1922. Since 1929, executive president, Brown and Root, Inc. Chairman of board, Texas Eastern Transmission Corporation. RIGHT CENTER: Arthur H. Bunker. Electrical Engineering at Sheffield Scientific School, Yale University. Former president Radium Company of Colorado. Founder and first president of United States Vanadium Corporation. Since 1949, president and director, Climax Molybdenum Company. RIGHT: Edward S. Mason, A. B., University of Kansas, 1919. Ph. D., Harvard University, 1925. Teacher and professor at Harvard since 1937. Dean of Graduate School of Public Administration since 1947. Not shown is the fifth member, Eric Hodgins. B. S., Massachusetts Institute of Technology, 1922. Former vice president of Time, Inc. Since 1946, member of Board of Editors of *Fortune*.

they come. The report details what it considers the essential tasks of technology, and says that to fill a great gap in attention to materials problems we shall have to plan our whole pattern of research better than it has ever been planned before.

What Will the Future Demand?

There is no way of predicting accurately how much demand there will be for any one material or group of materials in the future, because there are always the unknowns of changing price relationships, expanding technology, new products, and the like. If the price of copper goes very high more aluminum will replace it than if the rise is only moderate—but new products requiring copper many emerge and exert an opposite effect on copper demand. Therefore in projecting possible future demand it is necessary to assume that relative prices will stay the same as in 1950, which they are most unlikely to do. Some new substitution trends of one material for another are already in motion, thanks to the efforts of technology, and these have been taken into consideration in making a first, rough measure of future demand, although there is no attempt here to forecast revolutionary changes.

Findings and Forecasts - -

IRON AND FERRO ALLOYS

IRON—Prospective supplies of iron and steel material for the U.S. are such that market processes (supplemented by tax incentives) can be relied upon to satisfy normal needs. The industry is actively developing new sources of ore, building new capacity under the stimulus of accelerated amortization, and experimenting with new technology. The beneficiation of taconite should be given continued encouragement through accelerated amortization of facilities for tax purposes. The output of open pit ores can be expanded by using more labor and equipment in the pits. The ready availability of these ores should be assured by requiring removal of the overburden in favorable areas and reserving them for use in an emergency. Increased supplies of ore may be expected to come from overseas. There is no shortage of iron bearing material. The amenability to cheap concentration is a major, if not the dominant, factor in utilizing low-grade material.

MANGANESE—Use expands directly with steel output so the demand in 1975 is estimated 60 percent greater than in 1950. The principal problem is to meet demand in periods of emergency. The U. S. consumes about 1,500,000 long tons of high grade manganese annually. Production is about 100,000 tons annually. Any increase in domestic production must come largely from one of the 12 large low-grade deposits. The most important are Chamberlain, South Dakota; Cuyuna Range, Minnesota; and Artillery Peak, Arizona. The outlook for increased Free World production of manganese is favorable. Expansion is much less difficult and costly than for other metals. The ore is near the surface and usually can be mined by mechanical methods. Beneficiation is generally simple, washing usually suffices. Deposits in Brazil, Urucum and Amapa, are being developed and hold promise of a 600,000 ton annual production.

CHROME—Domestic reserves are meager. The Montana deposits are being reopened and appear to be able to supply about 10 percent of non-war requirements at competitive prices. Consumption is expected to about double to 1,750,000 long tons by 1975. Foreign reserves (Turkey, Africa, Philippines, New Caledonia) are estimated at 300,000,000 tons of contained chromite. The principal sources of supply for the last decade will continue as they have been, with a significant future geographical shift of metallurgical ore production within a generation.

NICKEL—Consumption is expected to double to 200,000 short tons by 1975. Canadian expansions will increase output 30 percent in the next few years. Nickel bearing deposits are known in Brazil, Venezuela, Tanganyika, Borneo, and the Philippines but they are low grade and treatment is costly.

MOLYBDENUM—The great Climax, Colorado deposit is the largest reserve of molybdenum. From it is mined about one-half the world's output. Demand is expected to increase 170 percent to 70,000,000 annual pounds by 1975. Most increased output will come from Climax where expansion is now underway. Additional molybdenum will come from French North Africa, Chile (copper by-product), and Norway.

COBALT—Consumption of this strategic metal has skyrocketed in the last 10 years and a 340 percent increase in consumption to 40,000,000 annual pounds is forecast for 1975. Production is largely a byproduct of copper. Eighty-five percent has come from the Belgian Congo where reserves are large and expansion possibilities good. Additional plants are building in Northern Rhodesia, Canada, and in the United States to recover cobalt.

TUNGSTEN—There are many small tungsten deposits in the U. S. and it is anticipated that more low grade deposits will be found. Production expands rapidly with an increase in price. It appears that the future supply of tungsten in the Free World may well be inadequate during the next 25 years, if measures to stimulate the search for the metal and development of new supply sources are not adopted in the near future.

VANADIUM—The U. S. is the largest producer and consumer. Demand will increase with steel capacity. Increased uranium recovery on the Colorado Plateau and from phosphate rock has increased output with the latter indicating a large possible byproduct output.

COLUMBIUM—The supply of columbium is smaller than that of any alloying metal. The outlook for large increases in output in the future is not favorable. An increase in price would permit mining of lower grade Nigerian deposits from which the world's largest output is obtained as a tin byproduct. Nevertheless, it is unlikely that sufficient columbium will be forthcoming to satisfy the potential demand for high-temperature alloys to be used in jet engines, gas turbines, rockets, and similar devices.

NONFERROUS METALS

COPPER—Total U. S. consumption of copper in 1950 was about 1,730,000 short tons. The total projected demand for copper is broadly consistent with the rate of increase of copper consumption of the past 30 years. U. S. demand is expected to increase by about 43 percent (to 2,500,000 tons) by 1975, as compared with a 54 percent increase expected in the rest of the Free World. Copper is no longer essential to most electrical uses, and indeed there are strong indications that it will be displaced by aluminum in many of them. Aluminum has already started to invade the market for use in motor windings, long considered to be copper's firmest stronghold. Over the years the U. S. copper industry has managed to find each year as much ore as is mined, in spite of an expanding production. As a result the

absolute value of reserve estimates has been gradually increasing, while "years supply in sight" has tended to remain constant. As the tonnage of ore that must be mined to yield a given tonnage of copper annually increases, the size of the plant and consequently the capital cost also must increase. The cost increase is greater than the comparatively small reduction in operating cost that might result from the larger scale of operations. Copper reserves in the U. S. in all categories are about 25,000,000 tons of recoverable copper contained in ore averaging about 1.0 percent.

LEAD—Demand for lead is expected to increase by 53 percent to 1,950,000 annual short tons from the 1,212,000 ton consumption in 1950. A projected increase in the scrap return indicates secondary lead will be more important in the U. S. than in the rest of the Free World where demand is anticipated to be up 78 percent. A 1950 estimate gives domestic reserves at 8,340,000 tons of metal or a 16-year supply at an annual consumption of 500,000 short tons. A similar estimate shows Free World, outside the U. S., reserves of 35,000,000 tons. The lowest grade district in the U. S. that is essentially all lead is the southeast Missouri district where the grade of ore reserves averages 2.0 to 3.0 percent lead.

ZINC—U. S. zinc consumption in 1975 will exceed that for 1950 by about the same percentage (39) as that by which our consumption of new zinc grew from 1925 to 1950. 1975 use forecast is therefore 1,500,000 tons. Scrap is relatively unimportant, about seven percent. The total cost of production is approximately the price of the metal (equally true for lead), because in order to extract the greatest financial return and at the same time to extend the life of an ore body and its dependent operation the operator does not "skim off the cream," but mines the leanest ore and employs the most effective (and not the least costly) metallurgical process that will yield reasonable profit: in other words, his costs tend to approach the price. Reserves of zinc ore have dropped only one year's supply despite six years' production according to two reserve estimates; one in 1944 and the second in 1950.

TIN—The U. S. has always been dependent on foreign sources of tin. Demand is expected to increase to 118,000 tons by 1975 from the 1950 consumption of 93,000. The use pattern of tin has been changing and should continue with use of tin for tin plate declining (more cans per pound of tin) and increasing amounts going into solder and babbitt. World reserves of tin are estimated at 5,000,000 long tons. Increasing production is from lode deposits, but the science of placering has and will continue to change submarginal tin placers into profitable mines and placer tin will continue as the largest source.

ANTIMONY—Consumption of antimony is expected to grow vigorously to about 28,000 tons of new metal in 1975. This is 80 percent above 1950. Nonmetallic uses are expected to grow much faster than metallic uses and will be about 20 percent of consumption compared to 16 percent in 1950. Free World reserves are estimated at 1,300,000 metric tons, 70 percent in Mexico and Bolivia. One-third to one-fourth of world production is a byproduct of the mining of other metals.

CADMIUM—At present prices the demand for cadmium is expected to grow more than 2½ times in the next 25 years. Cadmium is a byproduct of zinc and supply will be in direct ratio to the production of zinc, about eight pounds of cadmium being recovered per ton of zinc. Substantial rise in prices can be expected eventually. Substitutions for cadmium are expected to increase as the supply lessens and price increases.

BERYLLIUM—Demand for beryl in 1975 will be 2½ times as great as the 3,145 short tons consumed in 1950. Demand for copper-alloying and atomic energy purposes (moderator and neutron reflector) are both growing with no ultimate atomic energy consumption being forecast. Domestic mine production may increase to 1,200 tons by 1975. Argentina, India, and Africa are increasing production.

LIGHT METALS

ALUMINUM—Present uses are expected to grow vigorously and new ones will undoubtedly appear. If copper, lead, zinc, and tin continue in short supply, or remain relatively expensive, aluminum can continue to be increasingly substituted for those metals, as well as for other materials. Future demand for aluminum may possibly quintuple over the period from 1950 to 1975. Accordingly the U. S. consumption of primary aluminum might be 3,600,000 tons in 1975. It appears likely that ample quantities of electric power can be made available to meet any possible future expansion of the industry without significantly increasing the total real cost of production. Supplies of bauxite, the lowest cost source of aluminum, in the Western Hemisphere are large enough to meet any likely increase in demand. Brazil has large reserves not yet accessible to transportation. Venezuela, Colombia, and Ecuador have not been fully explored and may contain large reserves.

MAGNESIUM—This light weight metal can be obtained at moderate cost in unlimited amounts, but its large-scale use awaits technical improvements in alloying and fabricating. Capacity of seven plants in the United States is 130,000 annual tons. Only the Freeport, and Velasco, Texas plants with a combined capacity of more than 56,000 annual tons have a production cost less than the market price of 24.5 cents per pound.

TITANIUM—Raw materials are available to support a very large expansion of production. Technological problems must be overcome before titanium's superior characteristics can be utilized on a large scale. They include: development of a low-cost, continuous production process, development of usable alloys and the discovery of methods for preventing the contamination of the metal when hot or molten, improvement of methods for working, drawing, casting, machining and welding.

ZIRCONIUM—Uses for the metallic compounds are well established, but commercial use of the metal is still in the embryonic, experimental and high-cost stage. If experiments with zirconium boride (which can withstand temperatures up to 6,000° F.) are successful, considerable use of this alloy may develop in jets and rockets. More zirconium is available in Florida beach sand titanium tailing than market demands.

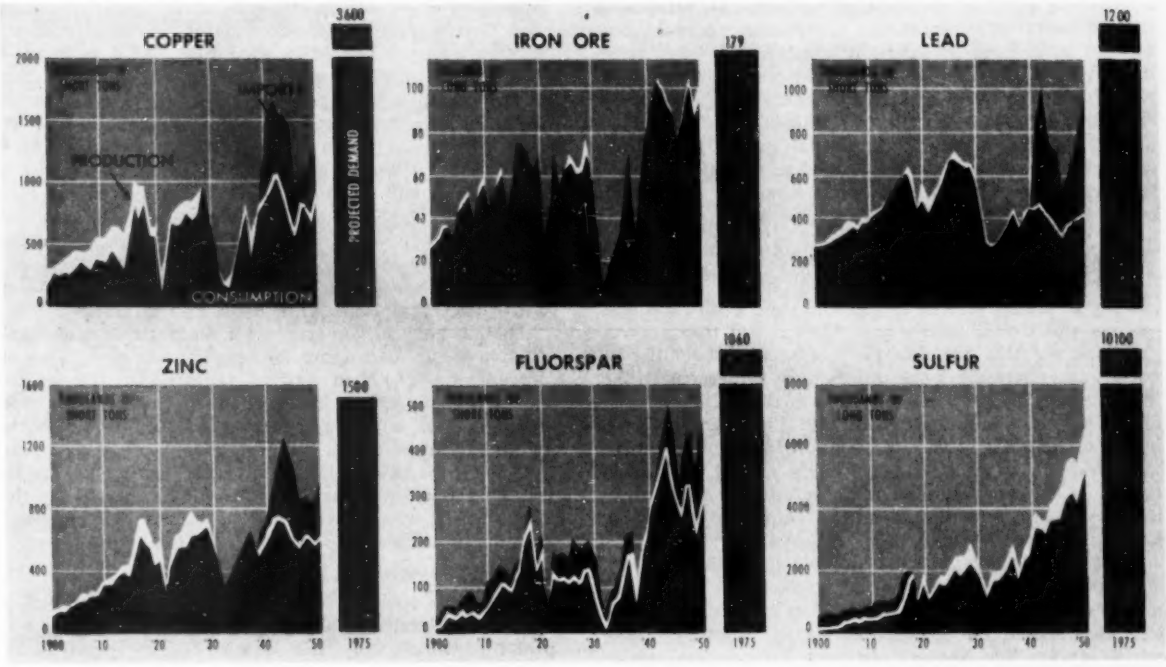
MISCELLANEOUS STRATEGIC MINERALS

INDUSTRIAL DIAMONDS—Increased use of carbide tools is lowering use of diamonds. World War II consumption was 0.1362 carat per ton of steel. In 1975 consumption is estimated at 0.10 carat. The entire annual world production would make about one airplane load so transportation from foreign sources presents no problem. now or in the event of a future war.

MERCURY—Demand is highly erratic but expanding slowly. Demand in 1975 in U. S. will be about 60,000 flasks and 140,000 in the rest of the Free World. Increased output, 40 to 50 percent, can be met from Italian and Spanish mines.

PHOSPHATE—The Commission terms this a "plentiful material" with known mineable deposits under present economic conditions equivalent to 1,300 years

U. S. PRODUCTION AND CONSUMPTION SELECTED METALS, PAST AND PROJECTED



consumption at current rate. World reserves are also sufficient for centuries.

POTASH—Adequate reserves of highly soluble potassium salts (chlorides and sulphates) have supplied 98 percent of past requirements and will continue as main source. Slowly soluble potassium compounds (largely polyhalite) averaging 13 percent K_2O occur in enormous deposits in New Mexico and Texas.

MICA—By 1975 most mica will be derived from domestic sources. "Builtup" and synthetic mica promise to make obsolete the need for hand processed mica splittings. Plastics and glasses will be increasingly used to replace mica for certain uses.

SULPHUR—Demand is expected to double by 1975. Low-cost salt-dome sulphur reserves are believed limited. Current shortages may not end before 1956. Many high-cost sulphur bearing materials are known. Technology on their treatment has improved so that the fundamental problem for sulphur supply is economic.

FLUORSPAR—Growing demand for domestic fluorspar has been projected to increase three times by 1975. U. S. reserves are the largest in the world. Fluorine from phosphate rock is the hope of the future. More fluorine (6 to 8 percent CaF_2) in phosphate rock is now wasted than is recovered from acid grade fluorspar. Fluorine from phosphate rock is now high in silica, and in cost, and recoveries are low.

The Commission Recommends — — —

FOR THE DOMESTIC MINERS

That the Department of the Interior, particularly in the Bureau of Mines, the Geological Survey, and the Office of Assistant Secretary for Mineral Resources, strengthen its program analysis staffs and intensify its fact-gathering and analytical activities in order to develop and maintain a comprehensive appraisal of the minerals and energy position and prospects of the United States and the free world. Particular attention should be given to minerals reserves and resources and to trends in exploration costs, technology, and patterns of use. Heavy emphasis should be placed upon analysis by professionally trained economists; and the study of geologic, technological and other scientific developments and prospects should be related more than it has been in the past to economic consequences and opportunities. *Special consideration should be given to the economics of small mine operations.* These enlarged activities should require only moderate increases in annual appropriations.

Mineral Appraisal and Analysis

That a complementary program of fact-gathering and analysis be undertaken by industry groups in the minerals field with special emphasis on collection and analysis of data on reserves, costs of exploration, and rates, trends, and prospects of discovery. Such a program calls for expansion of the statistical and analytical work now being carried out by trade associations and professional, scientific, and technical societies; consolidation of related activities in order to achieve comprehensive coverage of the industry by a small number of organizations; and the cooperation and financial support of the industry. Specifically, the AIME might take the initiative in working out organization and procedures

by which the mineral industries could gather, collate, and pass along to appropriate agencies of Government estimates of reserves and related information, much in the manner that the American Petroleum Institute performs that function for the oil industry. To safeguard the interests of reporting companies, prohibitions against publishing information disclosing the extent of individual holdings, and against use of such data other than for technical and economic analysis by the Federal government, should be continued.

That a complete census of mineral industries, already authorized by law, definitely be taken in 1954 and every five years thereafter. Sufficient funds for a comprehensive 1954 census should be appropriate.

Geologic Mapping and Cataloguing

That Congress direct the United States Geological Survey to accelerate the topographic and geologic mapping of the United States and Alaska, and that appropriations for this purpose be increased sufficiently to permit an expansion of the program by 50 percent within five years and 100 percent as soon thereafter as sufficient trained personnel is available. Priority should be given to mapping areas of most probable mineralization, and among those areas priority should be established so far as practicable in accordance with their likelihood of containing strategic minerals of which known domestic reserves are inadequate.

That an intensive program of basic scientific research and technical development be undertaken on techniques and instruments of exploration for minerals. The first step should be the appointment of a special committee under the National Science Foundation, made up of outstanding experts from Government, private industry, and universities, to make a full inventory of existing scientific and technical knowledge and research projects in the field, to determine the areas of greatest need for further research and development, to devise a coordinated program to be carried out by private groups and such Federal agencies as the Bureau of Mines, Geological Survey, Bureau of Standards, and Office of Naval Research.

Government Exploration

That direct exploration activities by Government be limited to those situations in which the national interest requires enlargement of reserves or knowledge about reserves but in which the risks are so great or the promise of reward in a reasonable period so small that private industry cannot be expected to undertake the work. Government exploration within these limits should anticipate and seek to avert emergencies rather than respond to them after they have developed. Hence such exploration should be part of the continuing activities of the Geological Survey and Bureau of Mines.

Mineral Industry Taxes

That percentage depletion be retained because of its strong inducement to risk capital to enter the mineral industries fields but that the rates now provided in the Internal Revenue Code be raised no further.

That Congress reconsider recent additions to the list of materials now subject to percentage depletion in the light of the principles stated above.

That the present limitations applicable to minerals other than oil and gas on the amount of permitted expensing of exploration costs be removed.

Financial Aid for Small Mines

That legislation be enacted establishing a system of financial assistance to small mining operations. The Federal agency (presumably the Bureau of Mines) charged with responsibility for the program should be empowered to make advances, up to $100,000 to any single applicant, to support prospecting for new deposits of minerals of strategic importance for which domestic reserves are inadequate or for the exploration and development of known deposits of such minerals. Interest charges should be moderate, *but a payback of 120 percent of the costs of the venture permits.* Advances for prospecting should be granted only on the condition that at least 25 percent of the costs of the venture are supplied by the applicant, and upon a finding by the administering agency the measure of risk is not exceptionally large for the type of prospecting contemplated. Advances for development should be granted only upon a finding that the project has reasonable prospect of success. The total amount of advances authorized should be on the order of 15 million dollars over a period of five years.

That in general Government loans for materials production be limited approximately to not more than 50 percent of the total investment required for the desired expansion of output. In exceptional cases, where it is impossible to attract private capital for 50 percent of required investment, public lending agencies might provide perhaps as much as 75 percent of the total capital. That profit-sharing debentures be obtained by the Government when government loans for materials development exceed 75 percent of the total investment.

Change the Mining Laws

That legislation be enacted making the alternative leasing available for all Federally owned mineral deposits to which only the system of appropriation by claims and patents is now applicable, i.e., all mineral deposits now subject to disposition under the Mining Laws. The determination of which system should apply in individual cases should be left to the initiative and preference of private prospectors.

That, in general, only tracts with respect to which exploration permits or leases have been granted (and hence a decision made on private initiative to proceed via leasing rather than appropriation) should be closed to general prospecting and the establishment of claims. For the guidance of prospectors, tracts leased or under permit or otherwise closed to appropriation by claims, should be marked and recorded.

That the leasing system (as an alternative for mineral lands to which only the system of appropriation is now applicable) should include the following features:

(a) Provision for granting exclusive prospecting permits of reasonable duration, terminable for failure to carry out a prescribed measure of exploration activity.

(b) Unless previous commitments prevent it, prospecting permits for whatever size tract the applicant requests, up to a prescribed maximum. The maximum should be large enough to permit use of advanced exploration techniques.

(c) A prospecting permit carrying with it a preferential right, in the case of discovery, to lease an agreed part of the area on terms and conditions established before exploration is begun and not subject to changes disadvantageous to the lessee.

(d) Only nominal royalties on leases granted under discoverers' preferential rights, so as to provide an incentive to exploration. Leases for tracts on which deposits already are proved or partially proved should, so far as practicable, be awarded by competitive bidding.

(e) Option for any prospector who has made a discovery sufficient to support the establishment of a mining

claim to take a lease at nominal royalties in lieu of a claim, and for any holder of an existing valid claim to surrender his claim in return for such a lease.

That the system of appropriation by claims and patents should be modified to include the following features:

(a) All nonpatented claims, adequately described, should be recorded in the Department of the Interior and that Department should prepare and make available accurate plats for the guidance of prospectors. Failure to record an existing claim within three years of enactment of the amendment should constitute abandonment. New claims should be deemed invalid until recorded.

(b) Future claims and patents should be limited to the mineral deposits thereon and to only such surface rights as are needed for mining purposes.

(c) No extralateral rights should be acquired with future claims and patents.

(d) The annual requirement for improvement of unpatented claims should be increased to $250. A three-year carry over for any excess should be permitted, as should the crediting of any excess spent on one of a group of contiguous claims to any of the others.

(e) The improvement requirement for granting a patent should be increased to $1,250.

(f) In addition to its present authority to invalidate claims on the ground that there has been no discovery, the Department of the Interior should be authorized to invalidate claims upon a showing (1) that the deposits discovered are insufficient to justify further development of the claim as a mining property, or (2) that assessment requirements have not been met.

(g) If within 10 years after a claim is established, no application to patent it is made, the claim should become invalid automatically.

STOCKPILING FOR SECURITY

That the vulnerability to enemy attack of the facilities for producing various materials within the United States and other Western Hemisphere countries be fully evaluated in estimating the amounts of materials to be stockpiled. The Munitions Board and the National Security Resources Board should decide whether or not carrying out this recommendation will require amending the Stockpiling Act.

Permanent Stockpiling

That stockpiling of strategic and critical materials be made a permanent instrument of the national materials policy of the United States, and that the provision of adequate funds at all times for orderly purchases commensurate with possible emergency needs be a fixed and constant policy.

That annual reviews of the objectives and purchase programs of the stockpile, such as are now planned should, under no circumstances, be omitted or delayed and that they should be comprehensive, including consideration of effects of proposed stockpiling measures upon the economies of the United States and other free nations, and of whether techniques other than stockpiling or in conjunction with stockpiling could better promote the national security.

That as a general rule stockpile acquisitions should be made at a minimum cost without favoritism to any producer, or group of producers.

That the "Buy American" provisions in the present stockpile act should be repealed.

AIDS TO FOREIGN MINING

That executive resource agreements with other governments should be negotiated when there are clear indications that new investment in minerals enterprises would take place in a particular country if legal and administrative deterrents were lifted.

Tax Credits for Foreign Investments

That the taxpayer be permitted to elect annually whether the "per country" or "over-all limitation" will apply in computing credits for taxes paid abroad.

That deferral of reporting income from overseas branches until the income is remitted to this country be permitted, as is the case with the subsidiaries.

That domestic corporations with foreign subsidiaries be given the same rights to file and obtain the benefits of consolidated returns as affiliated domestic corporations have.

That taxpayers be permitted in computing the portion of their dividends that represents taxable earnings to make a deduction corresponding to their share in the foreign corporation of the same outlays of the corporation for exploration and development as domestic producers are permitted to make and to treat that deduction as a return of capital rather than as taxable earnings.

Technical Aid for Foreign Miners

That increasing emphasis be given under the United States programs of technical assistance for underdeveloped areas to geological surveys, preliminary exploration, and advice on mining technology.

That support for these programs should be increased perhaps to as much as $4,000,000 a year.

That, wherever technical assistance is extended in these fields, the United States should seek assurances that the recipient country will promote conditions favorable to developing such resources as may be discovered.

Long Term Foreign Purchases

That a successor agency should be established whenever the Defense Materials Procurement Agency is dissolved, and that it should be empowered to make long-term contracts for periods up to 10 years for foreign-produced materials, including standby contracts and price-floor arrangements.

That a successor agency should be established whenever the present emergency agencies are dissolved, and that it should be provided with funds for financing foreign materials production in cases where special United States security interests justify assumption by the Government of greater risks than would be assumed by the Export-Import Bank in its normal operations. It is the view of this Commission that the Export-Import Bank should not lower its normal standards in making such loans out of its funds.

Remove Tariff Protection

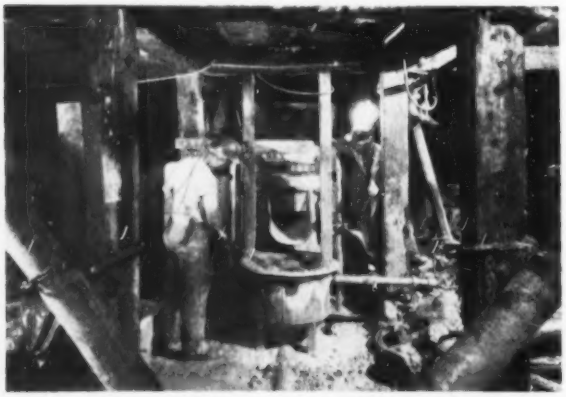
That permanent legislation entirely independent of the Reciprocal Trade Agreements Act be enacted authorizing unilateral elimination of import duty on any industrial material in either crude or refined form whenever it is determined that the United States is, or is expected to become, substantially dependent on imports of the material, and that such action is in accord with the national interest. Procedures for making such determinations should be specified in the legislation.

NEW PARK USES AIR-OPERATED CONCRETE GUN IN NEW STATION

Concreting of the new underground hoist station on the Mayflower Tunnel level of the New Park Mining Company's Park City, Utah mine was speeded by the concrete gun shown in the accompanying photograph. The new station is 60 feet long, 35 feet wide, and 20 feet high. It was cut in the foot wall of the Mayflower and Pearl fissures. A new 350-hp., double drum, Nordberg hoist with a 21,500-pound rope pull and a maximum effective hoisting depth of 3,000 feet has been transported underground through the 7,200-foot-long Mayflower Tunnel and assembled. The hoist will speed mining on the 1,505 level and permit faster development of the 1,630 and 1,860 levels.

The concrete gun was used to place the concrete for the station behind the forms in the following manner. Aggregate and sacked cement were transported underground by regular mine cars and stockpiled in the hoist room. A 6 S Rex concrete mixer was set up so that the mixed concrete could be dumped directly into the top of the gun. One miner controlled the mixer and another operated the gun. With a batch of mixed concrete in the mixer, the air inlet valve to the gun is closed and the feed hatch on top of the gun in opened. The mixer is tilted to drop the concrete into the gun through the top hatch. When the gun has been filled with concrete (4.12 cubic feet), the top hatch is closed and the air inlet valve is opened. The compressed air at a pressure of 90 pounds per square inch enters the top of the gun and forces the concrete from the gun through six-inch pines into the forms. Special long-radius bends are used in the discharge pipes to prevent packing of the concrete.

The gun was designed by the Granby Consolidated Mining, Smelting and Power Company, Ltd. at Copper Mountain, British Columbia.

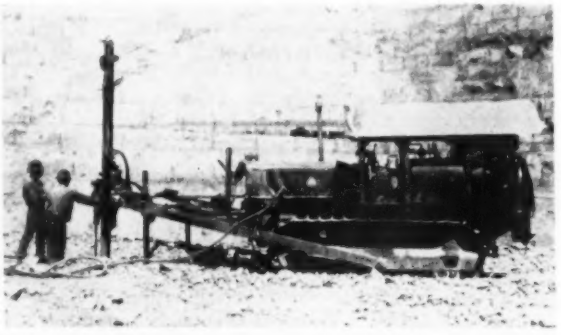


The concrete gun is opened for a batch of concrete during concreting of New Park Mining Company's new underground hoist station.

NEW DRILL RIG INCREASES FOOTAGE IN OPEN PIT MINE

A real timesaver in the form of a tractor-mounted pneumatic drill and compressor has been added to the equipment used in the open pit operations of a large copper company in Utah.

The new self-contained unit, called a Uni-Drill, consists of a Worthington WD40 four-inch air drill with 12-foot chain feed and a Worthington M80 two-stage air cooled compressor mounted with air receiver and water tank for wet drilling on a Caterpillar D7 or D8 tractor. The drill shell is mounted on a special D-frame, attached to the dozer trunions, in such a way that holes can be drilled in any direction. A front cable hoist raises and lowers the D-frame when moving the rig to a new location. Two easily adjustable legs support most of the weight of the frame and drill and a telescoping back brace steadies the drill against the frame.



The new Uni-Drill, Caterpillar-mounted Worthington equipment, is used in a large Utah copper pit for fast drilling at any angle. Records show nearly 900 feet drilled per 8-hour shift.

When drilling wet, too much water allows the heavier cuttings to segregate preventing easy steel extraction and too little water forms a mud so viscous that cuttings will not work out of deep holes—nor are they easily blown out at depths greater than about 15 feet. The problem, however, is not serious and experienced machine men have little trouble with stuck steels. On a recent construction job in Wyoming dry holes were easily drilled to a depth of 30 feet by using the drill's choke blow to extract cuttings.

At the Utah copper pit, the time required to move from one location to the next over average benches varies from two to six minutes; though even over the roughest terrain, moves seldom require over five minutes. Only two men are required to move and operate the rig and wherever a Caterpillar tractor can travel, the Uni-Drill can operate.

Shattuck Denn's Iron King mine near Humboldt, Arizona is outgrowing its present shaft (serviced by the large headframe at the left). A new deep-service shaft is being sunk to the immediate right of the pictured area for future ore removal.

NEW SHAFT FOR THE IRON KING

The Shattuck Denn Mining Corporation Is Equipping Its Iron King Mine In Arizona With A Deep-Service Shaft By Churn Drilling, Raising and Sinking

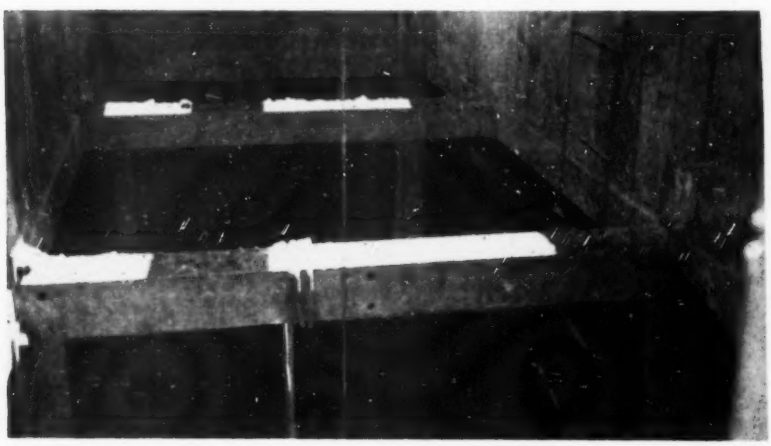
Shattuck Denn Mining Corporation's systematic exploration at its Iron King lead-zinc properties in the Big Bug mining district near Prescott, Arizona has indicated that the echelon system of veins being mined will persist to depths greater than the present hoisting arrangement could service. The mining areas have been opened in the past from five shafts and, though the present operating shaft, the Number 6, is now down 1,700 feet and is being steadily sunk to explore and develop lower levels, it was considered inadequate for efficient production from these depths.

To enlarge the Number 6 for deep mining service would obviously require an extended production break —both expensive and inefficient. Plans for a new vertical shaft, designated the Number 7, were therefore drawn up and a site was chosen 420 feet north of the Number 6 where a vertical shaft would not encounter ore zones or faults.

Original Planning

The new shaft sinking program is typical of the well planned operations directed by Iron King's manager H. F. "Hap" Mills and his staff, mine superintendent Elmer Tomkinson, assistant superintendent A. J. Zinkel, and chief engineer L. F. Bombaderi. To take advantage of the underground development beneath the proposed site, the shaft was to be advanced by the relatively inexpensive and rapid method of raising from these lower levels. A 16-inch churn drill hole from the surface to the 300 level was to be used to pass muck from the sinking operations at the collar. By this combination, all broken rock could be passed to lower levels and combined with the waste used for backfilling, obviating the need to hoist muck from the shaft.

The new shaft is to be completely supported with steel sets formed with H-beam end plates, wall plates and dividers, and angles as hangers. The two upper sets have been temporarily lagged until the shaft is ready for concreting.



When the initial opening was completed, a temporary welded steel headframe was erected at the shaft site and full scale sinking to the 300-foot level began. The shaft was planned to provide two hoisting compartments, one service compartment, and one sinking compartment. The service compartment is 5 feet 8 inches by 4 feet; the other three, 5 feet 8 inches by 5 feet 2 inches. The broken dimensions of the shaft are 8 by 24 feet with outside set dimensions 6 feet 8 inches by 22 feet. Final steel sets are bolted and blocked into place as sinking proceeds; the shaft will later be concreted to its full depth. Wall plates, end plates, and dividers are 6-inch H-beams; drilled butt plates are welded to the end plates and dividers to provide

A concrete passageway from the new shaft (below the temporary headframe in the background) to the head of the Iron King mill will house a conveyor for moving crushed ore. The floor and walls will be poured in place and the roof will be prefabricated. The building blocking the passageway trench is the present timber mill.

for bolting. The posts (acting as both posts and hangers) are 4-inch angles.

Shaft Mucking

Muck from the sinking operation is slushed to the centrally-located drill hole and passed to the lower levels. The material is moved from alternate ends of the shaft by a small slusher lowered to the shaft bottom after blasting. A heavy beam is suspended in the drill hole on wire rope to prevent oversize material from blocking the passage of muck. By hoisting the beam, chunks too large to pass are ejected from the hole and broken; muck is started down the pass before slushing begins by the same means.

The shaft has now been sunk 50 feet below the surface. When it has been carried down to the 200-foot level, the raises from the 200 to the 700 will be slabbed to the full size of the shaft and steel sets will be hung from the 200 down to the 700 level. Raises from the lower levels will be driven at the same time so that, upon completion of the shaft to the 700, the lower section (to the 1300) will be holed through and slabbing to full size can be continued. Stations have been cut on the 1,400 and the 1,500 levels of the Number 6 shaft and the new shaft will be raised from these levels when development permits.

The Number 7 shaft is to be carried first to a depth of 1,870 feet—though designed for service at much greater depth—and connected to the Number 6 shaft on all operating levels. The new shaft, when completed to this depth, will be used for ore hoisting and the Number 6 for supplies and men.

The 110-foot bolted steel headframe from the old Plymouth mine at Plymouth, California, assembled there in 1940, has been dismantled and shipped to the Iron King for erection over the Number 7 shaft when completed. The 85-foot distance to the sheave axle will permit the use of a 500-ton orebin and a 100-ton waste bin on the headframe.

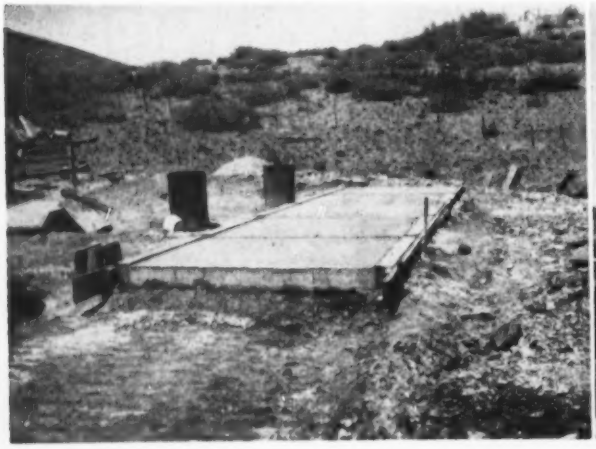
A new Nordberg counterbalanced, double-drum hoist (6-foot faces, 8-foot diameters) equipped with Lilly controls and powered by a 450-hp. motor will carry 5-ton bottom dump skips. The present sinking hoist will be maintained for service in the permanent sinking compartment provided in the shaft. The new shaft will allow the Iron King to increase its present production of 670 tons per day to over 900 tons per day.

Crusher and Conveyor

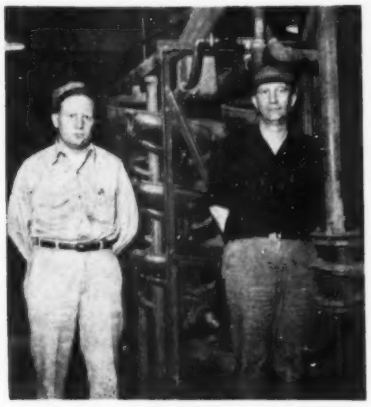
Ore from the headframe bin will drop to a primary crusher to be installed underground beneath the headframe. The crushed ore will be belt conveyed through a reinforced concrete underground passageway, 6 feet 8 inches by 7 feet, to the head of the Iron King mill. This passageway is now under construction as an open trench to facilitate the construction of the conveyor. The 8-inch walls and floor are being cast in place and the roof prefabricated in 6-inch slabs 6 feet square to be later placed and sealed with mastic. When the conveyor and passageway are complete, the enclosing trench will be filled and compacted to provide an unbroken mine yard. The present timber and framing mill, unfortunately in line with the conveyor passageway, is being replaced by a more modern structure.

(Watch future issues of *Mining World* for Iron King's new mining methods and mill expansion.)

LEFT: The roof of the conveyor passageway is being prefabricated in easily-handled slabs for later placement on the finished walls. RIGHT: The present timber mill will be replaced by this new and modern framing plant. The mining method evolved at the Iron King requires well-framed timbers for the efficient and rapid construction of chutes and flooring.



Superintendent E. W. Geist, left, and metallurgist H. W. Hard, are standing before a bank of Humphreys spirals in the pilot plant.



M. A. Hanna Company's Randville, Michigan pilot plant is now treating a specular hematite using gravity, magnetic, and flotation concentration methods.

SPECULAR HEMATITE PILOT PLANT

M. A. Hanna Company's Groveland, Michigan Pilot Plant Uses Humphreys Spirals, Magnetic Separation, and Flotation For Menominee Range Ore

M. A. Hanna Company's Groveland pilot plant at Randville, Michigan is an interesting sign of the times. This plant, with an input capacity of 10 tons per hour, includes equipment for crushing and grinding, a 30-foot thickener, Humphreys spirals, flotation cells, and a magnetic separator. What makes this plant a "sign of the times" is the fact that the ore being processed is low in iron content and high in silica.

Pilot Plant Follows Research

M. A. Hanna Company started basic research on this Menominee Range ore in 1948, with the work being done in the company's Hibbing, Minnesota laboratory. Construction of the pilot plant began in June 1951. Bacco Construction Company of Iron Mountain has mined approximately 25,000 tons of ore which is now stockpiled adjacent to the pilot plant building. This ore stockpile was crushed to minus-no-inches.

Basic pilot plant flow plan is as follows: minus-16-inch ore is recovered from the stockpile and fed to a 16-inch Telesmith gyratory crusher set for three-inch discharge. Material from the gyratory crusher falls to a conveyor belt which delivers it to a bucket elevator from which it is discharged into a 250-ton storage bin. Minus-3-inch ore is drawn from the bottom of the bin by a reciprocating feeder which discharges to an elevator for delivery to an Allis-Chalmers Low-Head 4 by 5 foot screen. This vibrating scalping screen carries $\frac{5}{8}$-inch meshcloth. Oversize falls to a Kuken 18-inch gyratory crusher set for $\frac{5}{8}$-inch discharge. Both the discharge from the gyratory and undersize from the screen are transferred to a 100-ton bin.

Rod Mill—Screen Circuit

Ore from the bottom of the bin is withdrawn by a Hardinge constant weight feeder and then is conveyed to a 5 by 10 foot Marcy rod mill operated in closed circuit with a Tyler TyRock repulping screen. Oversize from this screen is returned to the rod mill and undersize, minus-35-mesh, passes to an automatic sampler.

After passing the automatic sampler, pulp is pumped to a bank of Humphreys spirals. The first 10 spirals in the bank are for primary roughing. These are followed by six spirals which produce a finished concentrate. The spiral bank is completed by four scavengers that retreat coarser tailing from the first 10.

Coarse tailing from spirals goes to a Dings magnetic separator. Fines from the spirals are transferred to a 30-foot Dorr thickener. Concentrate from the magnetic separator is reground and also transferred to the thickener. Coarse tailing from the magnetic separator is the first waste material. Overflow from the thickener is used as mill make up water and underflow is transferred to a deslimer. The Desliming unit is a Cyclone, with overflow going to the tailing pond, and underflow to a bank of flotation cells.

Agitair Flotation

Flotation cells are 10 Galigher Agitairs. These flotation cells produce the final concentrate, as well as a final tailing. Concentrate from the spirals is transferred to a dewaterer and the flotation concentrate is pumped to an Eimco drum filter. Final product is weighed and then stockpiled to one side of the plant in two grades.

According to S. E. Quayle, manager of M. A. Hanna Company's Michigan mines, work at the pilot plant is still in the experimental stage and no set flowsheet has been decided upon. The foregoing might be spoken of as a basic flowsheet. There are many other possible circuits in the plant so that new methods and combinations can be readily tried. Superintendent at the Groveland pilot plant is E. W. Geist, and H. W. Hard is metallurgist.

John D. Mitchell Tells of

LOST MINES AND BURIED TREASURES

THE LOST MORMON LEDGE

In 1898, or thereabouts, an old Mormon with long white whiskers appeared at a small custom mill on the western edge of Ivanpah Lake, near the California-Nevada boundary, and disposed of several burro loads of rich gold ore. The old man did not disclose the source of his wealth and the mill operators did not press him for an explanation.

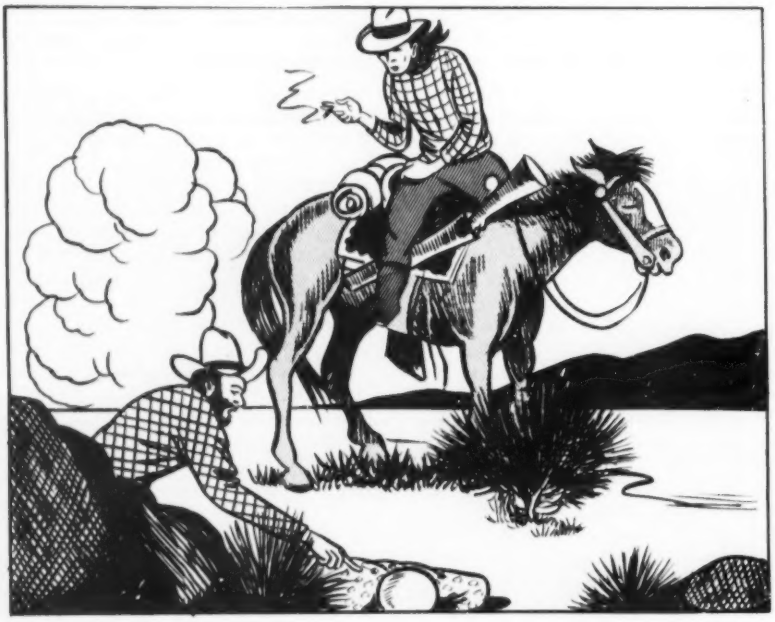
In the months that followed, the old prospector made several trips to the little mill, each time bringing a pack train loaded down with high-grade gold ore. Then the trips ceased.

Not long after his last visit to the mill, cowboys riding along the eastern edge of the dry lake bed came upon the body of the old man lying face down in the sand. The decaying carcasses of his burros were near by, for all had been shot to death. Rumors among the miners and cattlemen around Crescent and Searchlight had it that the old Mormon had been followed and murdered by enemies from Salt Lake City.

While there were several mines in the vicinity, the ore which the old Mormon had marketed did not show evidence of having come from any of them. Winfield Sherman, Ike Reynolds, Jim Wilson, and many other old-time prospectors around that part of the country were of the opinion that the ore came from somewhere in the McCullough Mountains northwest of Crescent. Old Joe Semenec, prospecting for Dr. Horsky of Helena, Montana, spent several months in the McCulloughs looking for the lost ledge.

The only clue any of the searchers ever found was the remains of a camp at a small spring in a narrow box canyon on the west side of the McCullough range. Some were of the opinion that the camp had been used by the old Mormon; others believed it to be the remains of Breyfogle's camp. Some small pieces of ore found there resembled that left at the Stewart Ranch by Breyfogle when he returned after his partners had been killed by the Indians.

Cowboys riding along the eastern edge of the dry lake bed came upon the body of the old man lying face down in the sand.



The ore brought to the mill by the old Mormon on his several trips was an iron-stained quartz, very rich in gold with small pieces of gneiss adhering to it. This indicated that it came from a gneiss formation, or that at least one of the walls was gneiss. Some pockets of high-grade gold were found on the southwest foothills of the McCulloughs in 1902, but the deposit showed no evidence of having been worked previously.

Jim Wilson, an old-time prospector in the Crescent country, spent several years searching the hills for the Lost Mormon Ledge. Most of Jim's operations were carried on north of the McCullough range where he picked up a piece of ore that matched that taken to the mill by the old Mormon. Whether the ore was a piece that had fallen from the pack train, or a piece of float from the vein was never determined. The rock was considerably weathered and showed an amazing amount of coarse gold plastered all through it.

The last time I saw Jim was at Vidal, California, just across the Colorado River from Parker, Arizona. He was trying to get a grubstake from the late Wyatt Earp of Tombstone fame so he could return to Crescent to have another try at the Lost Mormon Ledge.

Nevada Manganese Plant Ready for Trial Run

Initial tuneup of the new $2,500,000 plant built by Manganese, Inc. at the Three Kids mine near Henderson, Nevada, is scheduled for this month. The plant will treat 1,200 tons of ore per day, and produce between 450 and 500 long tons per day of metallurgical-grade manganese.

Railroad sidings are also being built which will extend to the Union Pacific railroad main line near Boulder City, Nevada. Storage bins will be installed beside the spur track to handle both incoming and outgoing shipments of material. Construction is being done by the McNeil Company.

This old manganese property was operated during the war by Manganese Ore Company for Metals Reserve Company. Manganese Inc. took it over as war-surplus from the General Services Administration and the Nevada-Colorado River Commission.

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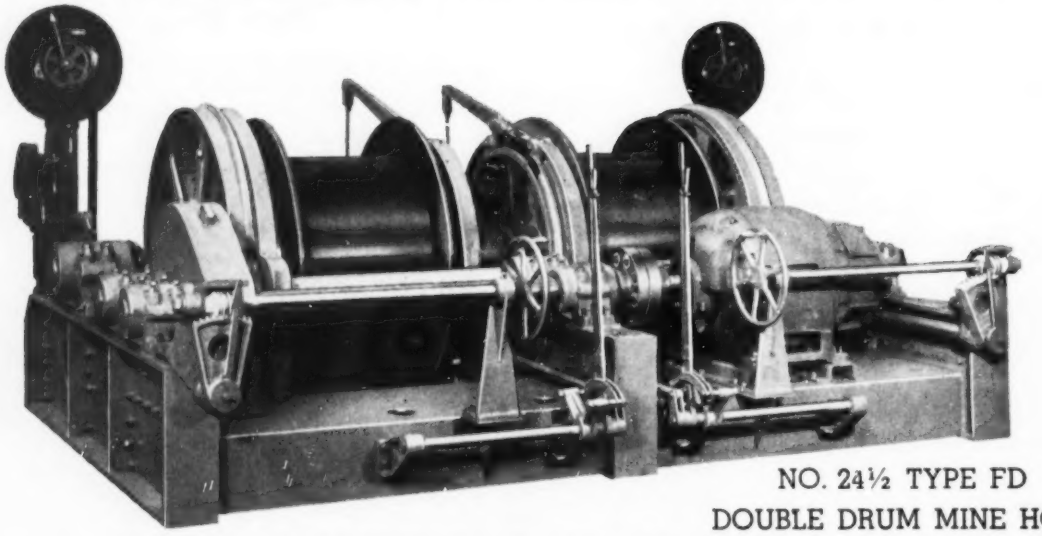

NO. 24½ TYPE FD
DOUBLE DRUM MINE HOIST

Rope Pull 7,500/3,500 Lbs. Rope Speed 475 F.P.M. with 75 H.P. Motor
Steel Post Brakes, Handlever operated. Friction Clutches. Hand wheel operated.
Flexible Coupling connection to motor. Herringbone Primary Gears.

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ACTIVITIES OF U. S. MINING MEN

George L. Dickinson and his son have set up their own testing laboratories at 1300 West Main Street in El Paso, Texas. Mr. Dickinson has been associated with the American Smelting and Refining Company for most of his 44 years' experience as an assayer and chemist. For the last eight years, he was with the El Paso Testing Laboratories.

John C. Kinnear, Sr. has been appointed United States representative to the Copper-Lead-Zinc Committee of the International Materials Conference. He succeeds **David T. Marvel** who will return to private industry. Mr. Kinnear will continue in his post as assistant to the director of the Office of Defense Mobilization for metals and minerals, and will also serve as chief adviser to DPA Administrator Fowler on all matters pertaining to copper, as they affect the defense production program.

Allen B. Hollett, formerly of Taconite, Minnesota, is now with the mining department of the American Smelting and Refining Company in New York City.

Joseph C. Kieffer of Kellogg, Idaho, has been appointed assistant manager of American Smelting and Refining Company's expanding operations in the Coeur d'Alene mining district of Idaho's panhandle. Mr. Kieffer worked at mines in Colorado, Arizona, Peru, and Argentina before coming to the Coeur d'Alenes 10 years ago. He built a pilot sink-float unit at the Star mill at Burke and later managed Hecla Mining Company's big sink-float plant on the Osburn flats. He subsequently served as manager of Sunset Minerals, Inc., and Spokane-Idaho Mining Company.

Ben Roberts has been named president of the newly organized Southwest International Mining Association at its meeting in El Paso, Texas; **O. Paul Lance** is vice president, and **George T. Cates** is secretary-treasurer.

Clinton L. Miller has accepted a position as mine superintendent at the Vermont Copper Company's operations in South Stratford, Vermont. He was formerly mine superintendent at the Mountain Hope mine of Warren Foundry & Pipe Company in Dover, New Jersey.

J. D. Crawford has been appointed general manager of Alaskan Operations of the U. S. Smelting, Refining and Mining Company. **J. C. Boswell** has been appointed manager of the Fairbanks Department. The Board of Directors elected **R. N. Hunt** to fill a vacancy on the board, and also named Mr. Hunt as vice president. He is chief geologist for the company. **G. H. LeFevre** was named vice president and manager of metal sales.

John Gernert has taken a new post as head pit foreman at the M. A. Hanna Company's Morton mine on the Mesabi Range, Minnesota. Mr. Gernert was formerly mine foreman at the Weggum mine, also on the Mesabi Range.

Harold A. Krueger has been appointed manager of the St. Louis Smelting and Refining division of National Lead Company. Mr. Krueger is the former production manager of the division.

Ernest Klepetko, former metallurgical manager for the Combined Metals Reduction Company's Calumet mine near Tooele, Utah, has recently retired from that position. He will operate a cattle ranch in Montana.

John F. Reed, former master mechanic at the M. A. Hanna Company's Clifton mine at Degrasse, New York, has been transferred in the same capacity to Hanna's Iron River, Michigan operations. Also transferred from the Clifton mine was William Ford, who will be assistant chief chemist at the Iron River operations.

Alfred E. Nugent, former manager of the N & N Mining Company, has joined the geological staff of the Bunker Hill & Sullivan Mining and Concentrating Company at Kellogg, Idaho.

Harold F. Lynn of the Southwest Engineering Company in Los Angeles, California, recently returned from a two-month trip to the Far East, where he investigated tungsten production in the southern provinces of Honchu Island. He also addressed more than 200 of Japan's foremost mining engineers.

Laurence T. Eck has been appointed plant manager of the cobalt metal refinery now under construction on the National Lead Company's property at Fredericktown, Missouri. The plant will recover essential cobalt, nickel and copper metals from ore concentrates at Fredericktown. **G. Edward Peters** has been named plant superintendent.

William Knudsen, of Ishpeming, Michigan, has joined the research staff at Jones & Laughlin Ore Company's laboratory at Negaunee, Michigan.

Charles E. Horning, Sennett Taylor, and **Olga Marquardt,** have been elected directors of the Lead Blossom Mining and Milling Company of Wallace, Idaho.

Joseph H. Thompson, M. A. Hanna Company; **Alex C. Brown,** Cleveland-Cliffs Iron Company; **Elton Hoyt II,** Pickands Mather & Company; **Ralph S. Archibald,** North Range Mining Company; **H. S. Taylor,** Oglebay, Norton & Company; and **W. C. Cohoe,** E. W. Coons Company, Inc. recently attended the first meeting of the Lake Superior Iron Ore Producers Advisory Committee to the Defense Materials Procurement Agency in Washington, D. C.

Walter R. Ekum, former city engineer of Monroe, Wisconsin, is now with the Copper Range Company at its White Pine, Michigan mine.

John Wise has been appointed general superintendent of the Idarado Mining Company operating in Ouray and San Miguel Counties of Colorado. Mr. Wise has risen to his present position from mining engineer, and has been intimately associated with Idarado's post-war expansion and development.

Barney Greenlee has been appointed general superintendent of the Resurrection Mining Company operations at Leadville, Colorado. Mr. Greenlee has been associated with Resurrection for several years. His last position was as assistant manager.

M. J. Sayers, metallurgist for the Galigher Company of Salt Lake City, Utah, has been in Rico, Colorado, doing some metallurgical work for the Rico-Argentine Mining Company.

ROBERT E. DWYER (left) has been elected president of Anaconda Copper Mining Company and its subsidiaries, the Chile Copper Company, Chile Exploration Company, and Andes Copper Mining Company. Executive vice president since 1940, he succeeds the late W. H. HOOVER who died in June. CLYDE E. WEED (second from left), vice president in charge of mining operations, has been elected vice president in charge of operations of Anaconda, and vice president of the three subsidiaries mentioned above. EDWARD S. McGLONE (second from right), vice president in charge of western operations, has been named executive vice president, while CHESTER H. STEELE (right), general manager of western mining operations, will succeed Mr. McGlone. Some changes have also been made in Anaconda's legal staff. JAMES T. FINLEN has been named Western general counsel of the company, filling a position vacated by ROY H. GLOVER when he was elected vice president and general counsel. SAM STEPHENSON, JR., heads the newly created labor relations department of the legal department.

ACTIVITIES OF INTERNATIONAL MINING MEN

CARLOS PIRES FERREIRA, Brazilian analytical chemist and a Point Four program trainee, is studying methods of mineral analysis employed in the U. S. Bureau of Mines Metallurgical Experiment Station at Salt Lake City, Utah. When he returns to Brazil after a year, Mr. Ferreira plans to establish faster and more efficient procedures for analyzing ores in the Laboratories da Producao Mineral.

Jacob Vandenberg and **John S. Holland** have joined the staff of the mining department of National Lead Company in New York. Mr. Vandenberg was formerly managing director of the Holland Metallurgical Works in Arnhem, Netherlands; assistant general manager in charge of tin operations in Indonesia for Billiton Company; and one-time general manager of the Texas tin smelter at Texas City, Texas. Mr. Holland was transferred from National Lead's MacIntyre development where he was chief geologist. He has also spent considerable time on company exploration projects in the U. S. and Canada.

C. F. Gardner has been appointed chief engineer of the Zinc Corporation Ltd. at Broken Hill, New South Wales, Australia, and **O. F. Fry** has been appointed assistant chief engineer. **R. B. Hislop** has been appointed assistant chief engineer of New Broken Hill Consolidated Ltd. in New South Wales. **I. M. Hardy** has been appointed surface superintendent of the Zinc Corporation and New Broken Hill Consolidated, while **H. M. Middleton** has been appointed engineer-in-chief of Zinc Corporation, New Broken Hill Consolidated, and Southern Power Corporation Pty, Ltd. at Broken Hill.

Raul Canedo Reyes, former director general of Minas y Petroleos, and former general manager of E. M. San Jose (property of C. M. de Oruro and run by the Banco Minero) has been appointed as Agent of the Banco Minero in New York.

Solomon Lieb, former general superintendent for the Bolivian Tin & Tungsten Mines Corporation at Huanuni, Bolivia, is now employed as a mining engineer with the DMPA in Washington, D. C. and may be reached at 203 Audrey Lane, Glassmanor, Washington 20, D. C.

Brigadier General T. B. Wilson, head of the United States Defense Materials Procurement Agency in London, has begun a series of visits to mines in Southern Africa and the Belgian Congo. During his tour, he will also visit the Rand and Salisbury in Southern Rhodesia.

L. H. Lange, vice president and manager of the metallurgical division of the Galigher Company in Salt Lake City, Utah, has returned to the United States after a two-month consulting trip to Africa. He visited tin properties in Nigeria for a group of English companies, Finsbury Pavement House in London, to study possibilities of improving recoveries of fine tin and columbite. In Morocco he visited the Zellidja mine to assist them in their problems of floating their semi-oxidized lead-zinc ores. On his way back to the U. S. Mr. Lange made a brief visit to the Buchans Mining Company at Buchans, Newfoundland for the American Smelting & Refining Company in connection with pilot plant studies that are being carried out on this complex ore.

E. M. Kline has been made general manager of the Huntington (West Virginia) Works of The International Nickel Company Inc. He succeeds **Herman M. Brown** who has retired. **G. K. Crosby** has been appointed assistant general manager of the Works to replace Mr. Brown.

L. A. Van Fleet has resigned from the U. S. Bureau of Mines to accept a position as safety engineer for Minas de Matahambre, Pinar del Rio, Cuba. Mr. Van Fleet had served as safety representative with the Accident Prevention Branch of the Bureau of Mines for 10 years. For the last six years he was stationed at Phoenix, Arizona, and during that time conducted safety training classes at many Arizona and New Mexico metal mines.

Ian D. Cameron has been appointed general manager of King Island Scheelite (1947) Ltd. Australia. Mr. Cameron was formerly general manager of Big Bell Mines Ltd. in Western Australia.

T. T. Heywood, a mining engineer for Sierra Leone Development Company, Ltd., is returning to England on leave after completing four years in Tanganyika and Uganda.

Louis Ware, president of International Minerals and Chemical Corporation, is making a world tour to study trade conditions. He will visit foreign offices and customers of International in Honolulu, Tokyo, Manila, Hongkong, Bangkok, Calcutta, Delhi, Bombay, Karachi, Beirut, Istanbul, and London.

E. Normand has been designated manager of the National Mining Society in Peru. Its name has now been changed to Sociedad Nacional de Mineria y Petroleo and the following directors have been elected: **E. A. Beartl, Hector Boza, A. C. Hall, P. Garrigue, R. P. Koenig, P. Lambright, A. Nycander, P. Rosello, and V. Sanchez Aiscorbe.**

S. E. HOLLISTER, associated with the Southwestern Engineering Company of Los Angeles, for the past 25 years, has been granted an extended leave of absence to go to Japan. There he will serve as mining and metallurgical consultant to Clyde Bruce Aitchison, Jr., who has extensive mining interests in the Orient.

Dr. Frank Stillwell has been elected a correspondent of the Geological Society of America. He is the first Australian to be so honored by the Society.

R. Campbell Williams has resigned his position as technical manager of New Metals and Chemicals, Ltd., in London, England, to begin private consulting practice specializing in the less common elements. In his post with New Metals and Chemicals, Mr. Williams was a key figure in the introduction of many of the "rarer" metals to industrial application. He is now available in a commercial or technical capacity to American, European or United Kingdom companies and may be contacted at 16, Robins Court, Kings Avenue, London, S. W. 4, England.

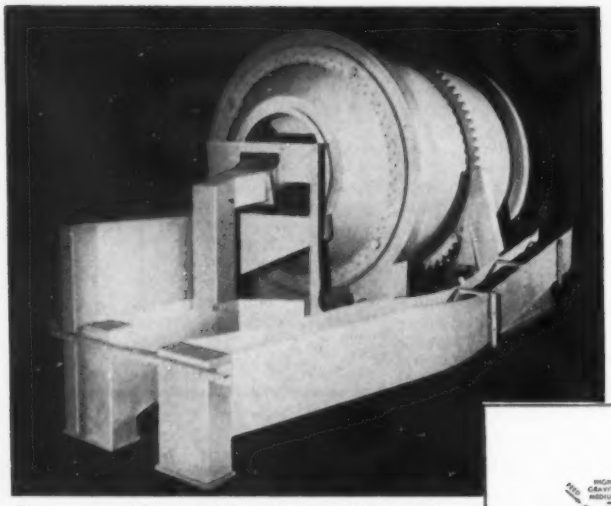
R. A. Macdonald has been named chief geologist of the Labrador Mining and Exploration Company, Ltd. Mr. Macdonald formerly did exploration work with the Mining Corporation of Canada, Ltd. and also teaches at Queen's University in Kingston, Ontario.

Dr. George Kenneth Williams has been awarded the Gold Medal of the Institution of Mining and Metallurgy in London, England, for his research work in the metallurgy of lead and zinc and the development of metallurgical processes.

C. D. Clarke, former superintendent of the Yauricocha mine of the Cerro de Pasco Corporation in Peru, has been

W. D. McMILLAN, a mining engineer with the U.S. Bureau of Mines, has been sent to Nicaro, Cuba, where he is supervising an extensive exploration and development program on the lateritic nickel deposits of eastern Cuba. The program is being conducted by the Bureau of Mines under an agreement with the Defense Materials Procurement Administration, and is expected to last six months. He may be reached in care of the Cuban Nickel Company at Nicaro.

HIGHER CONCENTRATE GRADES
...lower tailings



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is the only Heavy-Media Separator producing ***three*** *products by* ***absolute**** *gravity control*

Ores amenable to HMS and containing middlings are now successfully treated to produce an **optimum grade concentrate, lower tailings,** and an **accurately segregated middling** that can be reprocessed for maximum metallurgical extraction.

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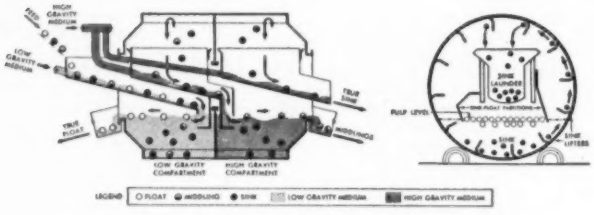
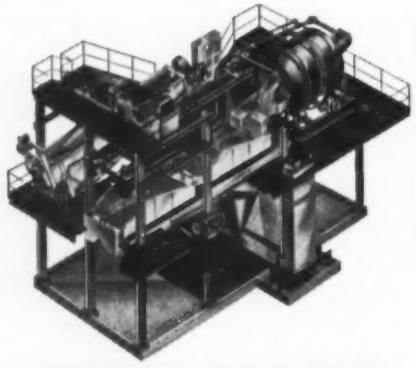
The superior metallurgical results of a two stage process are accomplished in **one** drum and **one** media reclamation circuit. There is no unnecessary duplication. Cost is a minimum.



A POSITIVE OPERATING PRINCIPLE

- True float is separated by a low gravity media in 1st compartment, while sink passes to 2nd compartment.
- True sink and middlings are separated by a high gravity media in 2nd compartment.
- Both high and low gravity media remain uniform and constant in density in their respective drum compartments.
- Overflow of float material and lifting of sink are simple, effective actions.
- The entire separation is accomplished within one unit.



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For ores having middlings, Wemco Double Drum Separators are furnished as the separatory vessels with Wemco Mobil-Mills—the prefabricated HMS plants used by the majority of Heavy-Media operators throughout the world.

Ores requiring less complex treatment are beneficiated in Mobil-Mills using popular single compartment Wemco Drum Separators or the efficient Wemco Cone Separator, depending on the nature of the separation involved.

★ Absolute gravity control provides **positive** separation of the middling by the use of a homogeneous medium. This prevents the lower grades and recoveries common with the partly heterogeneous actions of other types of separating units.

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EDMUND C. BITZER has resigned as vice president and general manager of the Colorado Iron Works Company and is now metallurgical advisor to the Raw Materials Division of the U.S. Atomic Energy Commission in Washington, D.C. Mr. Bitzer had been with Colorado Iron Works since 1941. Prior to that, he had been mill superintendent of Benguet Consolidated Mining Company at Baguio in the Philippine Islands; metallurgist for Raub Australian Gold Mining Company in the Federated Malay States; and mill superintendent of London Mining and Milling Company at Alma, Colorado.

transferred to the Corporation's largest mine at Cerro de Pasco as superintendent. Before joining Cerro, Mr. Clarke was with Cia Huanchaca de Bolivia for some years.

James D. Mason has been named president of Transcontinental Resources, Ltd., of Vancouver, Canada, following the resignation of **W. B. Milner. W. M. Gilchrist,** who is in charge of the company's operating mines, has taken the post of vice president.

Dr. J. A. Retty, prominent mining man in the Labrador iron ore field, has been appointed assistant to the president of Fenimore Iron Mines, Ltd. He will be in charge of technical staff responsibilities.

Jonas Svensson, formerly of Stockholm, Sweden, is now employed with the Stripa Mining Company at Guldsmedshyttan, Sweden.

A. J. Steel, formerly of the Emperor Gold Mines, Fiji, has been appointed chief metallurgist for King Island Scheelite (1947) Ltd. of Australia.

C. P. Keegel, former manager of Compania Minera Agua Fria, S. A. at Honduras, has resigned his position and returned to the United States. He may be reached at Las Vegas, Nevada.

Reginald A. Glahn has taken a position as mining engineer for the Andes Copper Mining Company in Potrerillos, Chile.

T. W. Leane has been named smelter and refinery superintendent of Mt. Lyell Mining and Railway Company, Ltd., of Queenstown, Tasmania, Australia. He was previously associated with the Electrolytic Refining and Smelting Company in New South Wales.

P. H. A. Zaalberg, formerly with the Nickel Processing Corporation in Cuba, has returned to Holland and is associated with Billiton Maatschappij in The Hague.

F. A. Green recently left Australia for the United States where he will represent Australia at the Annual Convention of the Lead Industry Association.

T. A. Read, metallurgist for Broken Hill South Ltd. of Melbourne, Australia, is on a six months' tour of England, the Continent, South Africa and Rhodesia. **F. Whitworth** of Broken Hill Associated Smelters, Port Pirie, Australia, is visiting England, Europe, and the United States.

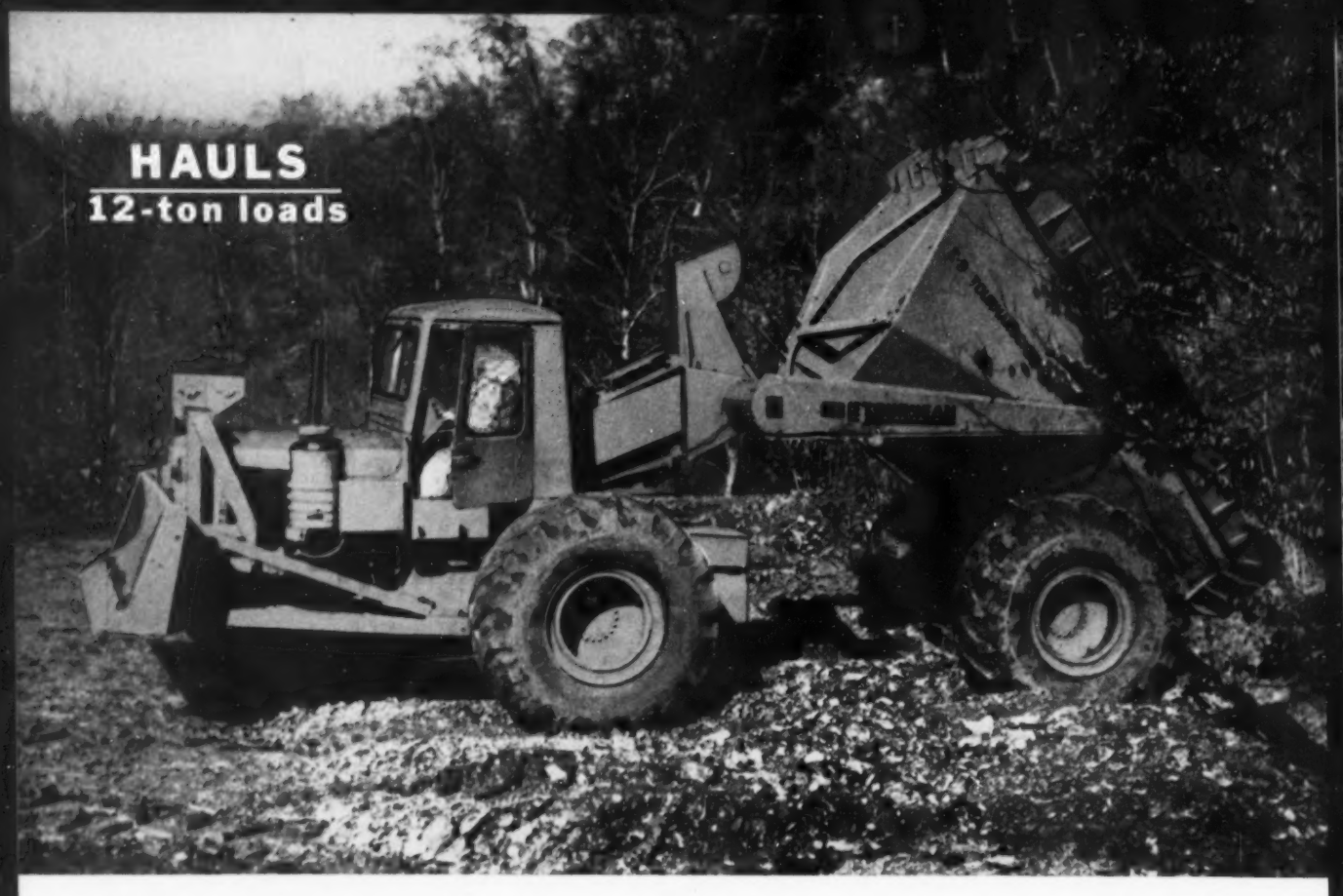
Dr. G. K. Williams, former works manager of Broken Hill Associated Smelters of Australia, and now consultant to Imperial Smelting Corporation (England) and other metallurgical companies, has been awarded the Gold Medal of the Institute of Mining and Metallurgy of Great Britain. The medal is the highest metallurgical honor in the British Empire, and only two other Australians have received it.

H. J. D. Bambrick has been appointed mine manager of the Dominion Asbestos Mines Ltd. of Montreal, Canada.

I. F. Crowe has been appointed mine manager to Australian Development N. L. at Nobles Nob mine at Tennant Creek, Australia.

Lockwood W. Ferris of Salt Lake City, Utah, has completed a consulting assignment with Anglo Lautaro Nitrate Corporation in southern Chile. Mr. Ferris assisted the firm in the solution of treatment problems of sodium nitrates at the Maria Elena and Pedro de Valdivia reduction plants east of Antafogasta, Chile.

L. D. Thomson has joined the staff of Mt. Isa Mines, Ltd. at Mount Isa in Queensland, Australia.



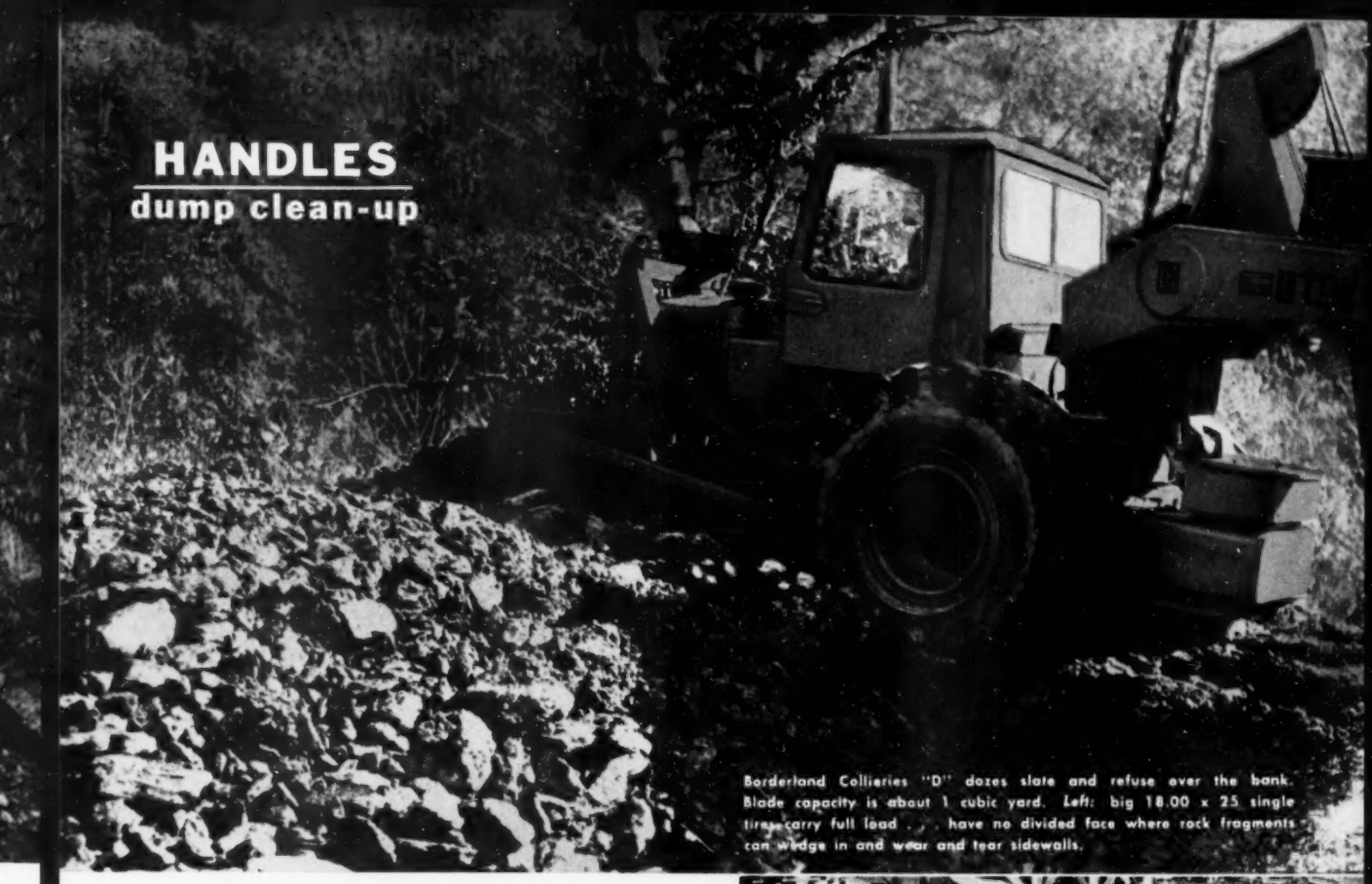
Rear-dump Tournarocker extra unit at W. Virginia

BORDERLAND Collieries of Bluefield cut costs at their Borderland coal mine recently by equipping a versatile D Tournapull prime mover with an electric-control bulldozer blade and a 9-ton rear-dump Tournarocker trailing unit. Rig teams up with standard truck to haul slate and refuse from tipple to spoil bank . . . dumps its load over the bank . . . then, as needed, cleans up spoil. Says Owner Bill Leckie, "The Tournarocker with blade saves us using another unit on the dump. It sure is a time and cost saver."

In spite of oversize 12-ton loads . . . adverse 7 to 10% grades over the winding 1500′ haul road . . . and frequent soft, muddy footing after rains . . . the "D" completes the rugged 3000′ cycle from tipple to dump and return in 2.3 minutes . . . an average speed of 15 m.p.h.

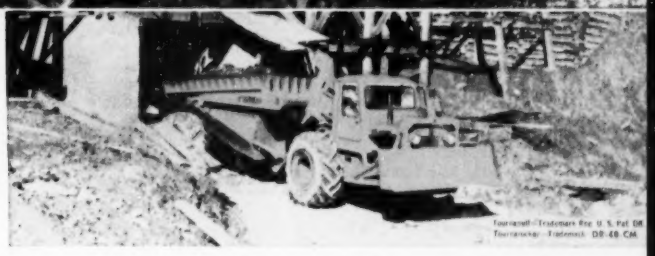
98% efficient in 1100 hours

In 1100 hours, Borderland's Tournarocker has been 98% efficient. By handling 75% of total yardage, it keeps production on schedule, yet cuts inventory, maintenance, and operating costs. To



Borderland Collieries "D" dozes slate and refuse over the bank. Blade capacity is about 1 cubic yard. *Left:* big 18.00 x 25 single tires carry full load . . . have no divided face where rock fragments can wedge in and wear and tear sidewalls.

eliminates Colliery



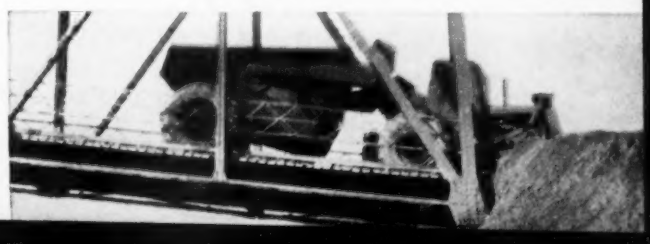
At tipple, Tournarocker with sideboards gets oversize 12-ton load. Reinforced, 3-ply steel-grid bowl takes shock loads of heavy slate without needing constant welding or patching. Simplified construction is rugged and dependable . . . with no frame, springs, hydraulics, you naturally need fewer spare parts, have less maintenance.

check what Tournarocker can do for you, see your LeTourneau Distributor. Ask him to show you Tournarocker's revolutionary features . . . over-the-bank electric dumping . . . 90° turns within 12′4″ radius . . . positive electric power steer . . . big single tires . . . simplified rugged construction (no frame, sub-frame, springs, hydraulic system) . . . interchangeability of rear-dump with scraper, crane and flatbed. Check owner-verified production reports . . . see for yourself how these features have paid off in extra profits on jobs similar to your own.

On rugged 3000′ cycle, the 122 h.p. "D" averaged 15 m.p.h. Big 4-wheel multiple-disc air brakes (2822 sq. in. total braking surface) have more than 4 times the braking surface of conventional haulers . . . provide safe, higher-speed operation on steep grades and over narrow winding haul roads . . . speeds spotting at shovel and on dump.

R. G. LeTOURNEAU, Inc., Peoria, Ill.

High-speed, rubber-tired, excavating, hauling, lifting equipment



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When S-A engineers tackle any bulk materials handling problem, they have two tremendous assets in their favor.

1. **They draw upon the cumulative experience gained through thousands of installations engineered by S-A to meet just about every kind of bulk materials handling need.**

2. **In addition, they have a complete line to work with that includes *all* types of bulk materials handling equipment.**

This combination of experience plus the *exact* unit or combination of units needed to do *your* job, is sound assurance that S-A can design and build conveying systems that will move your materials at lowest cost per ton. No matter how simple or complex your handling needs, write us when we can help you.

This S-A System of belt conveyors moves iron ore from receiving hoppers through crushing and grading operations to storage, then reclaims the ore from storage and loads it into rail cars at rates up to 500 tons per hour. A 500-foot belt conveyor on an elevated trestle has a self-propelled belt tripper that discharges ore into any desired storage area.

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DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

INTERNATIONAL NEWS

Liberian Government Asks Increased Iron Royalties

The Liberian Government has opened negotiations with the Liberian Mining Company, Ltd. for increased royalty payments on high-grade iron ore mined at Bomi Hills, 45 miles northeast of the sea coast port and capitol city, Monrovia.

Liberian President W. V. S. Tubman charged "that the present royalty payments are so low as to be insignificant." This statement is in sharp contrast to the government's contracts with Liberian Mining in 1945 and 1949, under which the mine concession was to be tax-free and the basic royalty to the government was to be five cents per ton with an escalator clause based on the price of pig iron.

The Liberian government now wants a 50-percent share in the net profits; representatives of the government on the mining company board; government to have voting rights as a stockholder; all ore sales at world market price with no price preferential to a stockholder in the company; and company indebtedness to receive priority consideration before determination of profit.

Republic Steel Corporation owns 61.57 percent stock interest in the mining company and has received the major portion of the 500,000 tons mined to date. Current production is at an annual rate of 1,000,000 tons. Between $10,000,000 and $11,000,000 has been invested in the mine and 45-mile, broad-gauge railroad and equipment between Monrovia and the mine. Royalty payments are now 17 cents per ton.

National Lead Acquires German Titanium Holding

National Lead Company has wholly acquired the largest titanium plant in Europe, Titangesellschaft m. b. H. of Leverkusen, Germany. National Lead has had a 50 percent interest in the firm since 1927, and purchased the remaining stock from I. G. Farbenindustrie.

Joseph A. Martino, president of National Lead, said the transaction was approved by the Allied Control Council. The plant, located in the British zone, has been operated by the British Military Government since its reopening in 1945.

Sales will be handled through National Lead's subsidiaries in Norway, France, Belgium and The Netherlands. Ilmenite ore for the plant, which is expected to have an output of titanium dioxide pigments adequate to supply all the requirements of Western Europe, will come from National Lead's mine and plant in Norway. Steam, power, water, sulfuric acid and raw materials other than ilmenite will be furnished under contract by Farbenfabriken Bayer.

The majority of titanium dioxide pigments produced at the Titangesellschaft m. b. H. plant will go to paint manufacturers, with lesser amounts going to the paper, rubber and ceramics industries. It is expected that the operation of the plant unit will be an important factor contributing to the rehabilitation of the European economy.

National Lead said production costs at the plant before the war were among the lowest in Europe. It is situated in the midst of the Ruhr district with ready access to such industrial requirements as iron, coal and transportation.

The plant was almost completely demolished by an air raid in October, 1944, but has been repaired and new equipment installed so that today output is nearly three times that of pre-World War II.

Erik Anker, managing director of Titan Company A S, a National Lead subsidiary, will supervise overall operations, and Dr. F. Raspe, who has been plant manager since pre-World War II days, will be in charge of operations at Leverkusen.

Italy's 1951 Metal Output Makes Impressive Gains

Production of ores and metals in Italy during 1951 recorded a marked increase over 1950, according to final production figures from the Montecatini Soc. Gen. Greatest increases were in arsenic ore, antimony ore, bauxite, mercury ore, and zinc ore. Lead ore output increased slightly but it had a slightly lower lead content than that mined in 1950. Production details for the principal ores and metals are contained in the following table.

Production of Ores and Metals in Metric Tons in Italy in 1950 and 1951

Commodity	*1950*	*1951*
Bauxite	153,433	174,274
Aluminum	37,070	49,750
Antimony ore	3,696	4,561
Arsenic ore	495	3,798
Cadmium	75	200[1]
Mercury ore	149,906	174,662
Mercury	1,839	1,856
Lead ore	63,213	64,269
Lead	37,469	36,000
Pyrite	895,459	898,023
Zinc ore	180,005	210,430
Zinc	38,119	47,227
Manganese ore	16,208	27,743

New DMPA Contract Will Double Cryolite Supply

A DMPA contract negotiated with the Pennsylvania Salt Manufacturing Company of Philadelphia will more than double the amount of cryolite available to the aluminum industry during the next 12 months.

Pennsylvania Salt is the only marketer of natural cryolite in the United States. The only known commercially workable deposit of cryolite in the world is in Ivigtut, Greenland. Owned by the Danish state, it is operated under concession by Kryolitselskabet Aresund A/D which also operates a cryolite plant in Copenhagen. The crude ore output from the deposit is normally divided equally by the Danish company with Pennsylvania Salt Manufacturing Company whose processing plant is near Pittsburgh.

Payment of a premium price to the Danish company is involved in the DMPA contract. This is for the additional ore which is to be produced by stepping up normal mining operations. Under this arrangement, the Pennsylvania company will receive an allotment of 31,000 long tons of ore during the year, instead of the 12,000 long tons usually shipped.

The government will buy the 13,700 short tons of cryolite expected to be produced by increasing the scale of mining operations. Since the extra tonnage will cost the salt firm $100 per long ton of ore instead of the usual $30, DMPA has agreed to pay $260 per short ton for the cryolite. Current market and ceiling price is $190 per short ton. It will be resold to aluminum companies working on defense production at the market price.

General Base Metals Expanding Facilities

General Base Metals Inc., recently awarded a certificate by the Philippine Society of Metallurgical and Geological Engineers as "managanese producer for the year 1951," is expanding its plant facilities to carry out its program of mechanizing mine operations.

The company's principal mining claims are situated on the island of Bohol. The company owns a pier in Guindulman, Bohol, through which its manganese shipments are made. Additional loading facilities have been installed recently, thereby increasing the daily loading capacity to a maximum of 1,200 tons of manganese. Since the first of the year, the company has made four shipments—one to the United States, and three to Japan—totaling approximately 14,500 dry tons of manganese.

Rising Costs Absorb Metal Price Increases in Mexico

There was a general decrease in Mexico's mineral production during 1951, attributed primarily to an exhaustion of the known and commercially productive mines in Mexico, according to Gustavo P. Serrano, president of the Mining Chamber of Mexico, who considers 1951 "an emergency year" for Mexico's mining industry.

He reports that increased costs of production more than absorbed whatever increases there were in market sales prices, forcing many miners to decrease production. Heavy taxation for the mining industry has also tended to discourage mining operations. However, the Mexican government has promised to reduce some of these taxes to somewhat alleviate the higher costs now faced by the industry.

IN MINES and QUARRIES

JOB AVAILABILITY PAYS OFF!

Euclid Bottom-Dump Coal Haulers of 20 to 40 ton capacities have diesel engines to 300 h.p. . . . loaded speeds up to 34.4 m.p.h.

Rear-Dump Euclids of 10 to 34 ton capacity have travel speeds to 36.3 m.p.h. with full payload and diesel engines of 125 to 400 h.p.

For open pit mining and quarry operations, Euclids are unmatched for job availability and long service life. "Eucs" have large capacity and plenty of power and speed to move more loads per hour at more profit per ton.

Bottom-Dump Euclids are engineered and built as complete units with good weight distribution, and tremendous power. Short wheelbase of the tractor and the universal hitch design make them easy to handle and permit short turns in narrow cuts.

Rear-Dump "Eucs" have body designs for all types of materials—coal, ore, rock, overburden and other heavy excavation. Their rugged construction withstands the impacts of loading heavy materials and travel on rough roads—assures low operating and maintenance costs.

Put Euclids on the job and be on more jobs! Ask your Euclid Distributor for information on the models best suited to your off-the-highway hauling requirements.

The EUCLID ROAD MACHINERY Co.
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EUCLIDS *Move the Earth*

Canadian Firm Will Send Refined Copper to U.S.

Campbell Chibougamau Mines Ltd. of Montreal, Canada, has agreed to supply 63,000,000 pounds of electrolytically refined copper to the United States by December 31, 1956. The copper would come from the company's mining property on Merrill Island in Dore Lake, Quebec.

The company has agreed to develop the property at its own expense and to provide all necessary facilities, including a concentrating mill with a capacity of not less than 2,000 tons per day. Production is to start in not less than 2½ years and will reach an annual output of about 37,250,0000 pounds.

For its part, the Defense Materials Procurement Agency may buy any or all of the company's output at the market price, or 24.5 cents a pound f.o.b. Connecticut Valley points, whichever is higher. Campbell is required to offer to industry in the United States any output which the DMPA does not take under its option .That which the company cannot sell or dispose of in the United States will be purchased by the DMPA at 24.5 cents a pound f.o.b. Connecticut Valley points.

With the signing of this agreement, DMPA-industry agreements thus far negotitated will have increased the supply of copper available to the United States for the period 1951-56 by 430,-000 tons.

B. C. Increases Iron Ore Shipments to Japan

Mines in British Columbia will be supplying iron ore to the Japanese steel mills at the rate of approximately 100,000 tons per month. The Argonaut Company, Ltd., a subsidiary of Utah Construction Company of San Francisco, is now shipping from 60,000 to 70,000 tons per month from Campbell River on Vancouver Island. This ore is mined near Upper Quinsan Lake.

Texada Mines, Ltd., an independent company, has recently brought into production a property located on the west side of Texada Island. The rate of production of this operation will be from 20,000 to 30,000 tons per month.

India Focuses Attention On Limestone Deposits

Considerable attention is being given to low alkali limestone deposits in the Indian states of Bihar and Assam because of the recent demand within the country for low-heat cement. It is estimated that 10,390,000 tons of cement will be required by India in the future for various concrete projects.

Many of the limestone deposits suitable for the manufacture of cement have already been developed, so future cement industries will probably be located near limestone deposits of poorer quality. As such, limestone beneficiation will be necessary. The Geological Survey of India has recommended the flotation method of beneficiation for the following limestone deposits: Mandhali limestones in Kalsi, Dehra-Dun district: crystalline metamorphic limestones of Gangpur, of Chhanngu in southeast Sikkim, and Bhainse Dobhan in Nepal; and the siliceous and magnesian limestones of the Rohtas stage in the Mirzapur district.

A diligent search is also being made for Pozzolana materials which would reduce somewhat the quantities of cement needed for concrete. Though the right type has not yet been found in India, rhyolite and trachyte deposits in Deccan Traps are being studied, along with fullers earth deposits in Jodhpur and Jammu.

Britain and Rhodesia Negotiate on Copper

Negotiations are taking place between the British government and the Northern Rhodesian copper companies with a view toward establishing a new basis for fixing the price of copper which the British government, the sole buyer for British users, will pay.

Currently, the Ministry of Supply's price has been based on U. S. prices which have been calculated on the New York export quotation. This has led the Ministry to raise prices to £281 a ton—a record jump of £50. While it means a gain in income for the Northern Rhodesian companies which produce 300,000 tons a year, the high price is reportedly not welcome because the firms will have to raise wages in line with the new price which they do not believe will last.

In about a year, copper will become a "sterling" commodity—that is, greater producing and refining capacities will be available in the sterling areas doing away with the need for processing in the dollar areas of the world. It is expected that trading on the London copper market will be resumed when increased output from the new electrolytic refinery in Rhodesia reaches a capacity of nearly 200,000 tons a year. This presumably will enable Britain to do away with purchasing of copper from Chile.

Salmita Flies Equipment To Mine In North Canada

Air freight transportation is proving to be cheaper per ton than ground transportation in Canada's far northern mining areas. At least that is the report of Salmita Consolidated Mines Ltd. which is operating a tungsten-gold property 150 miles northeast of Yellowknife in the Northwest Territories.

Salmita, preparing for production this year, is flying in to its barrenlands property several hundred tons of supplies, equipment, and personnel for its entire 1952 operation. Figures so far have shown costs of only about $90 per ton by air, against $160 per ton by tractor train.

For "Operation Air," Salmita has bulldozed a new airstrip on the property near Matthews Lake. Supplies and equipment are assembled at the town of Hay River on the south shore of Great Slave Lake and flown directly to the mine in six- to seven-ton loads. A complete 100-ton mill is being flown to the mine from Yellowknife. Transportation is on a day-and-night basis with rotating air crews.

Immediate program at the mine is to enlarge the shaft from two to three compartments, and to deepen the shaft to 300 feet for second-level operation. The mill will be erected and additional components will be on hand to step up capacity to 300 tons daily when needed.

Raise Production Goal For Synthetic Cryolite

An annual production goal of 50,000 tons of synthetic cryolite by 1955 has been set by the Defense Production Administration. Present capacity is 36,-700 tons annually, and before Korea capacity was 21,600 tons. The United States has also been getting about 20,000 tons of natural cryolite annually from Greenland, but these supplies are reported to be dwindling. Cryolite is a vital part of the electrolytic reduction process used in the making of aluminum.

Suggest Mexican Mining Be Regulated by One Group

Establishment by the Mexican government of a semiofficial organization to control mining is being advocated by the directive council of the National Institute for the Investment of Mineral Resources. The organization would be similar to the Petroleos Mexicanos, the official oil company, and would have charge of all activities connected with mining throughout Mexico. These activities are now handled by various official and semiofficial departments, committees, and institutes.

Among the items suggested in the plan would be the erection of lead and zinc refineries at strategic points; the establishment of more iron and steel plants to fully utilize the iron deposits; the founding of byproducts industries to attain maximum yield from metals and minerals; the opening of mining machinery factories to eliminate costly imports of the equipment; the setting up of laboratories and metallurgical plants in every state in Mexico, if need be; the establishment of metal treatment plants in Mexico's most mineralized zones; and provision for economic and technical aid to individual miners, as well as mining companies.

The plan suggests that financing of the organization would be from the taxes that miners and mining firms pay to the government, and which the Institute estimates to be about 900,000,000 pesos ($10,410,000) annually.

France Will Increase Tungsten Production

Tungsten production in France is to be increased by the Societe des Mines de Puy-Les-Vignes. The firm is one of the leading producers, and operates the Puy-Les-Vignes mine southeast of Saint-Leonard-de-Noblat in Upper Vienne. Increased output will come from the Montebelleux mine which was operated by the Germans during World War II and has now been dewatered. Robert Vallet is president and director general.

Australian Gold Producers Make "Premium" Sales

A report on the effective work of the Gold Producers Association Limited was presented at the annual general meeting of the Chamber of Mines of Western Australia, held at Kalgoorlie. The association was formed on December 7, 1951 to implement the Commonwealth Government's decision to allow newly mined gold to be sold for industrial purposes on premium markets outside Australia.

Membership in the association is held by gold producers in Australia, Papua, and New Guinea. Net proceeds of premium gold sales are distributed quarterly to members proportionately to their production. Sales of gold were made during November and December 1951, and during the first quarter of 1952, at prices from $3.24 to $5.60 per ounce above the fixed price for gold.

R. J. Agnew of Fimiston, Western Australia, is chairman of the association. Other officers are J. E. Manners and A. A. McLeod of Fimiston; G. L. Clark and J. C. Guest of Melbourne; J. M. Newman of Brisbane; and C. F. Adams representing the Western Australian government. G. H. Jennings of Kalgoorlie is secretary.

Increase Tungsten Output From Canadian Mine

With the opening of the new addition to its company mill, the Emerald mine near Salmo, British Columbia, has increased its tungsten output from 250 tons a day to between 600 and 700 tons, making it one of the continent's biggest tungsten producer.

Operated by Canadian Exploration Limited for the government, this is the first tungsten mine in Canada to be reopened since the end of World War II. Two other tungsten properties are now being developed in British Columbia, one at Hazelton, owned by Western Uranium Cobalt Mines, Ltd., and the other at Atlin, owned by Black Diamond Tungsten Ltd.

OCEANIA

PHILIPPINE ISLANDS—*Consolidated Mines, Inc.* has inaugurated its newly installed ship loading conveyor loading system which is expected to increase production capacity from the present 30,000 tons a month to 50,000 tons monthly. The belt is 1,200 feet long, running from under the storage bin to the ship. It easily loads 3,500 tons of ore in 24 hours. A railroad will be built from the mine to the wharf in order to facilitate operations. This new project will take about a year to complete. The company's expansion program has been made necessary by the increased demand for chromite in the United States caused by the United States defense program. The mine expects to double the 1951 output of 301,835 tons by the end of this year due to the installation and operation of the conveyor loading system.

WESTERN AUSTRALIA—The Department of Mines is carrying on a search throughout Western Australia for sulphides to be used in the manufacture of sulphuric acid. The *Koolyanobbing* iron deposits at Southern Cross, 120 miles west of Kalgoorlie, are among those to be prospected by drilling.

INDONESIA—*Algemeene Industrieele Mynbouw en Exploitatie Mu (A.I.M.E.)* was able to declare a dividend of 15 percent for 1951 because of profits from a volcanic sulphur deposit near Bandung and from a sulphuric acid plant near Surabaja. A profit also resulted from the selling of low-grade manganese ore from the dumps of the manganese mine near Djokjakarta.

PHILIPPINE ISLANDS—*Pan Philippines Corporation* sent its initial shipment of copper ore to Japanese smelters toward the end of May. The shipment of 460 tons dry weight was estimated to contain 88,296 pounds of copper, 26.85 troy ounces of gold, and 1,020 troy ounces of silver, with a value of $22,288.87 after deducting smelter charges. The ore which was shipped contained 9.59 percent copper. Pan Philippines was organized in Manila in 1937 and was the first company to use the words "Pan Philippines" in its corporate name.

NORTHERN TERRITORY—*Pioneer Scheelite N.L.* reports that the headframe and hoist are being erected at McArthur shaft, and buildings for the power house, new mess, and staff quarters are nearly completed. In preparation for production, the company has started breaking ore at the 85-foot level.

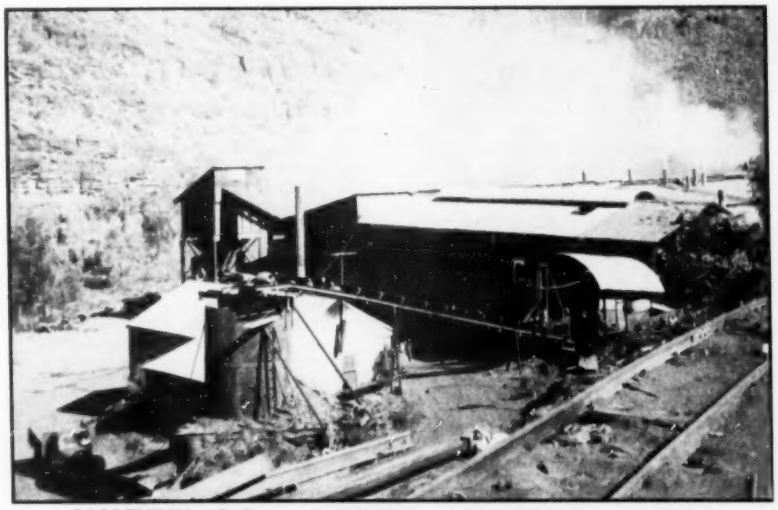
PHILIPPINE ISLANDS—*United Paracale Mining Company* at Paracale, Camarines Norte, has joined the list of gold producers with an initial shipment valued at Pesos 162,065.18 from 4,008 tons of ore milled. Its full mill capacity of 8,500 tons per month should be reached shortly. United Paracale is experiencing less pump difficulty in unwatering the *Longos* mine, and has almost reached the 400 level. Due to the heavy flow of water (almost 4,000 gallons per minute) and caved conditions of the mine operations, this has proved to be the most difficult piece of work encountered in the rehabilitation of the mining property. However, work has now reached the stage where ore is being produced from the 300-level stopes.

VICTORIA—*Central Victoria Dredging N.L.* has increased the digging capacity on its Amphitheater dredge which is temporarily out of operation and is making other alterations to dredge deeper ground with boulders. Latest production figures for four weeks show 57,600 cubic yards treated for 232 ounces of gold. The company's Jim Crow dredge is treating in excess of 100,000 cubic yards per month of 2.5 grains per cubic yard grade.

TASMANIA—A dolomite deposit at Smithton, on the northwest coast of Tasmania, is now in production. The deposit covers 27 square miles and has about 2,000,000 tons of dolomite available for use in agriculture.

PHILIPPINE ISLANDS—*San Mauricio Mining Company* is progressing satisfactorily with the opening of the Sta. Inez vein. Sections of this vein are said to be running better than Pesos 50 per ton (with gold at Pesos 70 per ounce.) In the Tacoma section, a winze has been started to develop below the 750-foot level (the deepest in the mine) and work shows a vein of good width running high in gold values.

VICTORIA—Wolframite workings at Fainting Range about 200 miles east of



WITTENOOM GORGE ASBESTOS FIELD

Valuable deposits of crocidolite or blue asbestos are being developed in the remote northern area of Western Australia. The crushing plant above is at Wittenoom Gorge where the Colonial Sugar Refining Company, one of the most important in Australia, is spending huge sums in preparation for a large output. Dust, not smoke, is seen rising from the vents. Canadian asbestos experts have aided in mine development and operation of the processing plant. Asbestos is found in nearly horizontal beds up to 10 feet thick.

further prospecting has been recommended by the Government Geological Survey.

NORTHERN TERRITORY—A diamond drilling campaign is being undertaken by *Eldorado Tennant Creek Ltd.* to explore anomalies indicated by a government geophysical survey in 1936. The first hole is reported to have intersected low-grade ore at the indicated position. The new cyanide plant is said to be working satisfactorily.

PHILIPPINE ISLANDS—*Coco Grove, Inc.'s* dredge, the "Mary Angus," is currently digging in ground which is of a better grade, but which is also difficult in character to work because of the many boulders on bedrock. The unworked area which is the objective of the present dredging schedule lies just ahead but future operations will have to determine whether the dredge can continue to work the ground containing the boulders at a profit. Salvage work on the dredge "Anne Petronella" has reached the stage where an attempt will soon be made to float the hull.

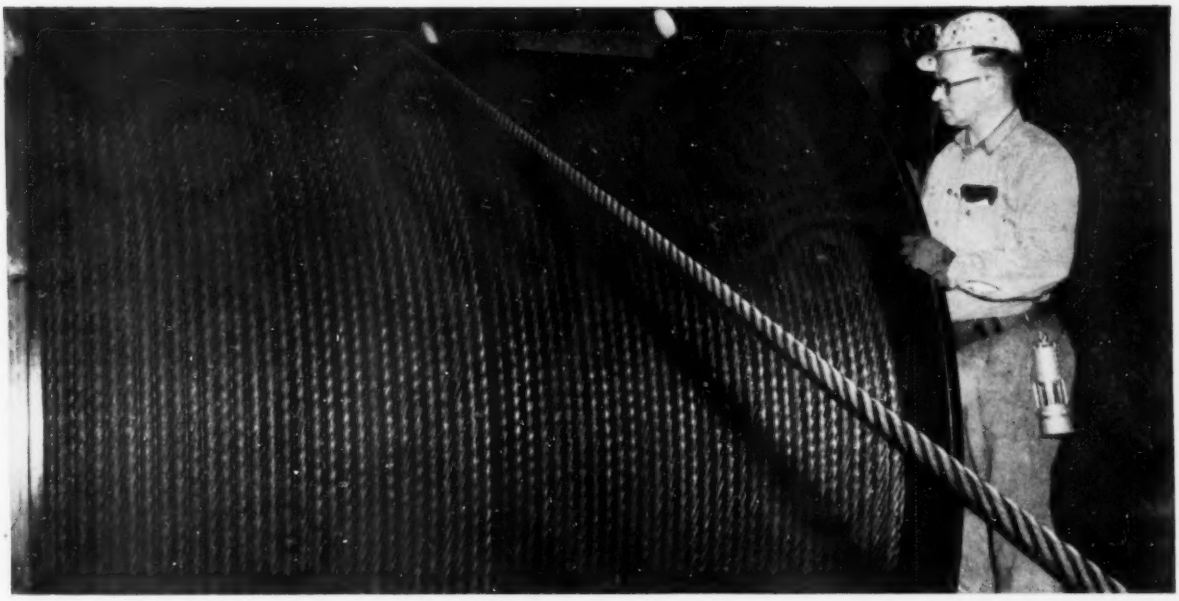
WESTERN AUSTRALIA—The discovery of an extensive high-grade deposit of copper is reported by two prosectors who located it when lightning tore open the side of a hill and exposed the deposit. Samples have assayed up to 60 percent copper and a general survey suggests an average yield of more than 20 percent. *Anglo-Westralian Mining Pty., Ltd.* has taken an option over a large area and will test the load further.

PHILIPPINE ISLANDS—Development work is continuing at the property of *Itogon Mining Company* near Baguio, Mountain Province, and plans are to reopen the 1,300-level drain tunnel, the deepest driven to date. This tunnel had been driven a distance of 3,300 feet before the war and will now have to be extended an additional 5,000 feet in order to intersect three larger vein systems. This will give 425 feet of vertical distance below the present deepest workings for the development of the ore reserve which will extend the life of the mine for many years. Exploration work on the Itoe vein system continues to open ore of better than average grade.

SOUTH AUSTRALIA—*Broken Hill Pty.* will build eight large freighters at the shipyards of Whyalla on Spencer Gulf. Two of the ships will be 10,000-ton ore carriers for the company's own use, while the remainder—four cargo ships and two colliers—will be built for the Australian Shipping Board.

PHILLIPINE ISLANDS—The manganese mine in Ivisan, Capiz, has been reopened and is sending manganese ore to the United States. The mine is now being operated by the *Panay Mining Development Company, Inc.*

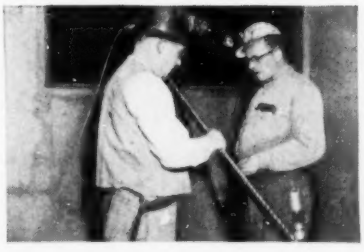
PHILIPPINE ISLANDS—Local gold mining operators have been perturbed by reports of the renewed drive being waged by government intelligence agents against illegal dealers in the precious metal. There had been a rather steady decline in the price of gold in the domestic market even before the recent raids. A year ago the price was as high as Pesos 160 per ounce. In recent months, however, the price was more or less stabilized at between Pesos 120 and Pesos 130, and in recent weeks a gradual decline brought the price down further to Pesos 112 or lower. The last sale was at about Pesos 109 per ounce for refined gold just before the raids were made. Mining men feel that if the present situation continues, they will not be able to dispose of their



"A 1¼" Tiger Brand Wire Rope on this 600-H.P. hoist hauled over a million tons of coal before we retired it," says Supt. Don Newberry, of Independent Coal & Coke Co.'s Kenilworth, Utah, mine. "And I'd say that this Tiger Brand rope will last just as long!"

Hoist rope hauls over a million tons for Independent Coke & Coal Co.'s Kenilworth mine!

"Ropes take a real beating on this hoist," says Mr. Newberry, here checking the socket connection of a 12-car trip with Safety Engineer Sam Fratto. "They pull maximum loads of 64 tons up a 5600′ haulageway with an 11% grade and 10° curvature. This means working under constant chafing and stress."



Free services of a Tiger Brand representative, left, are available at all times to the Independent Coal & Coke Co. He is always glad to make an on-the-spot study of any problem. Where necessary, he can also call in a Tiger Brand Field Engineer, who is a specialist on mining rope application.

For any mining job you handle, rely on tough American Tiger Brand, the wire rope that's rigidly controlled by United States Steel from raw ore to finished product. To get all the stamina engineered into it, you're welcome to the services of a Tiger Brand Field Engineer. Contact your local distributor or write to Columbia-Geneva Steel, Room 1422, Russ Building, San Francisco 6.

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UNITED STATES STEEL

FULLY MECHANIZED LOADING in the Netta Mine as an HT4 Traxcavator Shovel on a "Caterpillar" D4 Tractor shovels ore into a W10 Wagon pulled by a "Cat" DW10 Tractor.

SMOOTH, FIRM HAUL ROADS are kept in top condition in the Netta Mine by a "Caterpillar" No. 11 Motor Grader. In this lead mine, the Eagle-Picher Co. has 18 miles of haul road.

How to Mechanize a Lead-zinc Mine

After World War II, Eagle-Picher Co., which operates 17 lead-zinc mines in the Tri-State Area, began a full-blown mechanization program. "Caterpillar" equipment played an important role.

Mine Data:

88 miles of underground roads. Veins run 18 to 132 feet thick. Mines are room-and-pillar construction with 40-50 foot pillars spaced 50-100 feet apart. Ore, assaying about 3%, loosened by drilling and blasting.

Problem:

Get the ore to the surface quickly, economically, dependably.

Solution:

"Caterpillar" Motor Graders, Tractors, Wagons, 'Dozers, and Traxcavator Shovels, all equipped with air scrubbers for exhaust. Equipment disassembled at surface, lowered, and reassembled.

West Side Mines #1 and #2

"Cat" No. 11 Motor Grader keeps 15 miles of haul road smooth and firm, 404 feet underground, for trucks transporting ore. "Caterpillar" Diesel D4 Tractor with HT4 Traxcavator Shovel loads 1½ tons per bite, ore weighing 100 pounds per cubic foot. Trucks carry ore to hopper near skip hoist, which brings ore to surface and into another hopper. Rail cars are loaded from surface hopper at an average of 784 tons per day.

Netta Mine:

The 18 miles of road in this mine, also near Cardin, Oklahoma, are rougher. They can be because the haul is made by a fast "Cat" DW10 Tractor pulling a W10 Wagon. "Caterpillar" D4 Tractor with HT4 Traxcavator Shovel loads 131 tons per shift. Big yellow team makes 3 round trips an hour over 3½-mile haul distance with average load of 15 tons. Wagon loads hoppers, which load 1-ton "cans" for elevation to surface.

Your "Caterpillar" Dealer has a wide selection of equipment engineered to increase your mine production. Rugged, dependable "Caterpillar" equipment means speed; speed means money.

CATERPILLAR TRACTOR CO. • SAN LEANDRO, CALIFORNIA; PEORIA, ILLINOIS

new production at a price which will permit them to keep up operations. A continued decline in the market any lower than the last sale price, they point out, would virtually make gold operations unprofitable and would have the effect of checking the postwar recovery of a major industry.

NEW ZEALAND—The *Martha Gold Mining Company (Waihi) Ltd.* ceased milling operations in December. The last few months have been spent in treating ore and in clean-up.

GOLD COAST—Further negotiations are underway concerning the possibility of harnessing the 1,000-mile Volta River as an aid to increasing aluminum production. The proposed hydroelectric power project reportedly would cost about $420,000,000 and would enable processing of about 1,000,000 tons of bauxite into 210,00 tons of aluminum each year. Representatives of the British and Gold Coast governments have been meeting with officials of the *British Aluminum Company* and *Aluminum Limited* of Canada.

SOUTH AFRICA—*Randfontein Estates Gold Mining Company* has been carrying out a drilling and development program to determine whether certain conglomerates found on the property contain uranium. £40,000 has been spent to date on the project.

BELGIAN CONGO—The Kolwezi electrolytic zinc works of *Metalkat*, a subsidiary of *Union Miniere du Haut Katanga*, expects to be producing around 36,000 tons of zinc by the middle of 1953.

SOUTH WEST AFRICA—Development is continuing on the body known as the Nickeltal pegmatite. *Uis Tin Mining Company (South West Africa) Limited* reports that additional faces in the larger pegmatite bodies have been opened in preparation for large-scale mining. The ore from these faces assayed 0.34 percent metallic tin. Prospecting and development work on the smaller irregular bodies will be resumed soon. Major pieces of machinery for the new 1,000-ton-per-day plant are being installed.

ORANGE FREE STATE—The construction of the plants for the *Daggafontein* and *Western Reef* mines is proceeding rapidly and the extraction of uranium may begin early in 1953. The *Anglo American Corporation of South Africa Ltd.* reports, also, that the No. 3 Vertical Shaft at Western Reefs mine has been completed, and that the Subvertical Shaft is nearing completion. Development on the Vaal Reef horizons should begin early next year in both the Western Reefs and Vaal Reefs mines. It is expected that by the end of 1953 most of the mines in the Free State will be producing gold.

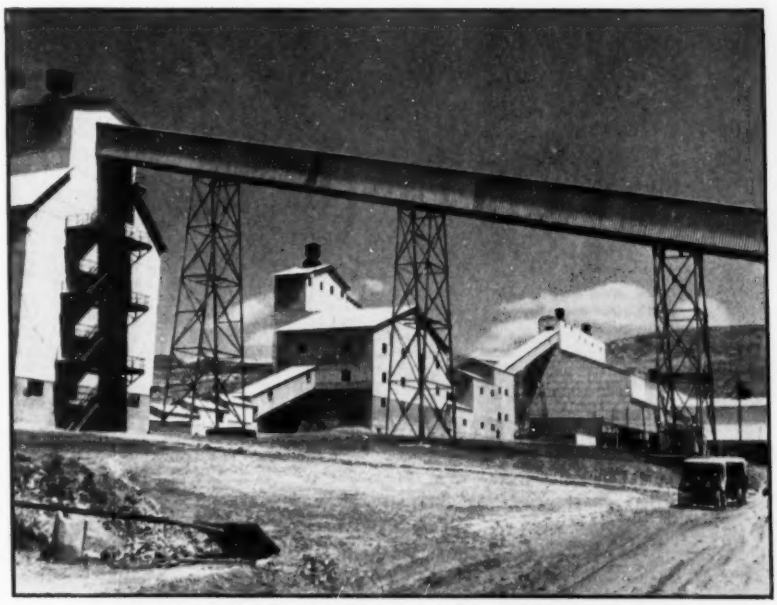
SOUTH AFRICA—The main shaft on the "B" lode of the *Leeuwbosch* lead mine has been sunk to the 200-foot level and a crosscut started. The main lode should be intersected shortly when driving, north and south, begins. The incline shaft on the "A" lode has been sunk 50 feet to facilitate haulage of ore. A new vein parallel with the "B" lode has been exposed and surface trenching carried out for 300 feet with promising indications. New development for the quarter totalled only 90 feet because of a great deal of extraneous work carried on to prepare for handling increased tonnages of ore.

NIGERIA—*Mines Development Syndicate (West Africa) Ltd.* has undertaken exploratory work on behalf of several Nigerian tin mining companies and the *American Smelting and Refining Company*. It reports that negotiations for leases covering any areas likely to be commercially profitable have culminated in a Special Ordinance, "Mineral Development (Lead-Zinc) Ordinance, 1952," which grants a Special Exclusive Prospecting License to the Syndicate and entitles the Governor to grant mining leases to the Syndicate. The new license covers the same area as the current license which expires in March 1953, but extends the coverage to 1957; and the mining leases will be granted for 30 years in the first instance, with a right to renewal for a further 30 years. The Nigerian government will receive payment on a sliding scale, based upon the ratio of yield to recovery.

FRENCH WEST AFRICA—Crews and equipment have been moved onto the property in Mauritania in which *Frobisher Ltd.* of Canada holds a one-third interest. Drilling should get underway soon and will probably continue into next year. Preliminary examinations have indicated an estimated 50,000,000 tons of iron ore. The present program is designed to outline 100,000,000 tons which is considered the minimum amount of tonnage needed to make the project worthwhile, since, for instance, construction of a 250-mile railway to the Atlantic coast would be necessary.

SOUTH AFRICA—*Free State Geduld Mines* announces that between 4,809 feet and 4,812 feet below the collar, No. 1 shaft passed through a heavily faulted zone of Basal Reef. At 4,812 feet, the reef was faulted out of the shaft by an upthrow fault and reef exposure was limited to approximately one-eight of the perimeter of the shaft. The reef was badly broken and samples taken at irregular intervals from the fractured portions gave values averaging 26.48 dwt. over a channel width of 7.14 inch, equivalent to 189 in.-dwt.

SOUTH WEST AFRICA—It is reported that the *South African Minerals Corporation* has entered into a new contract with buyers in the United States whereby the Arican firm will receive 274s per long ton for plus-48-percent manganese, compared with the previous level of 252s 6d f.o.b. Walvis Bay. Since July 1951, the entire manganese production of South West Africa had been going to Walvis Bay exclusively. Operations have continued to disclose that the manganese bodies are of higher grade



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In the past two years, the Societe des Mines de Zellidja at Bou Beker, Morocco, has greatly expanded its operations. With the assistance of the Newmont Mining Corporation and the St. Joseph Lead Company, Zellidja has increased its mining and milling operations from around 8,000 tons per month to the present rate of about 100,000 tons monthly. The ore assays about 4.0 percent lead and about 3.0 to 3.5 percent zinc. Current production is now approximately 3,250 metric tons of pig lead and 1,600 metric tons of zinc per month. Zellidja, together with the Societe Miniere et Metallurgique de Penarroya, has constructed a Scotch Hearth smelting plant with 10 Newnam hearths at Oued El Heimer, about 16 kilometers from the mine. A lead blast furnace is also under construction.

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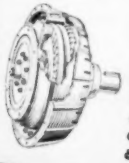

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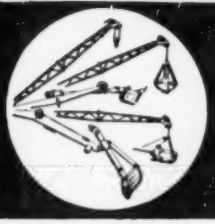

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and larger in size than was previously estimated. It is rumored that the United States manganese producers are considering the possibility of advancing £3,000,000 to erect a smelting and refining plant for South African Minerals' South West African production.

TRANSVAAL—*Platinum Prospecting Association No. 3* is undertaking further investigation of the farm Boschkoppie No. 685 in the Rustenburg district by means of a limited scheme of underground exploration. During the latter part of last year, they proved that the major portion of the farm was underlain by the Merensky Reef. Because of the encouraging values disclosed in the boreholes, it was decided to obtain further essential information about the nature of the deposit. Good progress is being made with the erection of the necessary buildings and plant and some underground work has already started. *Transvaal Consolidated Land and Exploration Company Ltd.* has a 45 percent interest in the association.

ENGLAND—A new company, *Wolfram Prospecting Syndicate, Ltd.*, has been formed to prospect for and to develop wolfram deposits in Cornwall. *New Consols* mine is reportedly interested in the venture. Operations are now under way at Trebartha, near North Hill on the eastern end of Bodwin Moor, and near the New Consols mine at Luckett.

NETHERLANDS—The *Royal-Dutch Petroleum Company*, together with the *Standard Oil Company* of the United States, has discovered a rock salt deposit near the town of Winschoten at the eastern border of the province of Groningen. As Winschoten lies not far from the North Sea harbor of Delfzyl, this discovery is considered of great economic importance, particularly because the depth of the salt layer is not so great—namely about 350 meters.

NORWAY—The Ministry of Industry has asked the Parliament for 3,300,000 kroner to explore possibilities for domestic refining of pyrite, of which there is an estimated quantity of 50,000,000 to 60,000,000 tons. Most of the pyrite now being produced is sold abroad. A sum of 800,000 kroner has been requested for investigation of wolframite and molybdenum deposits in the valley of Oerdalen.

SPAIN—The price of quicksilver at Spanish ports has been reduced from $200 a flask of 76 pounds to $165 a flask, bringing the price more in line with the actual market for the metal. The new price is equivalent to about $188 to $190 a flask delivered at New York after adding various charges. At the old price of $200 which had been in effect for about a year and a half at Spanish ports, the price was equal to $223 to $225 in New York.

INTERNATIONAL

ITALY—A six-month survey of the Italian iron and steel industry has just been completed by the five U.S. experts who undertook the job within the framework of the ECA's technical assistance program. The group visited 13 major iron and steel plants and held meetings with 72 other concerns in the field. They have expressed confidence that the Italian industry will be able to overcome the many difficult problems facing it.

SWEDEN—One-fifth of Sweden's iron ore exports are now going to the United States, while 15 years ago Sweden sent only 4 percent to the U.S. In 1951, the U.S. received 19 percent or 2,600,000 tons. Western Germany was the largest importer, having purchased 29 percent of Swedish iron exports. Britain received 25 percent; while Belgium and the Netherlands received 14 percent.

ENGLAND—*South Crofty, Ltd.* reports that development footage at its mine has been increased and the excavation for the new electric pumping plant is proceeding satisfactorily. A hostel for Italian miners is nearing completion and it is hoped to have this increased labor force available for work soon. At the *Castle-an-Dinas*, work is going ahead in preparation for shaft sinking to explore the lode below the present No. 7 level.

YUGOSLAVIA—Deposits of chrome ore are reported to have been found in southwest Serbia, estimated to contain about 500,000 tons. Yugoslavia's chrome reserves to date, without these new deposits, are estimated at 1,500,000 tons.

EAST GERMANY—A new nickel smelter is said to be under construction at St. Egidien near Chemnitz. The first 60-ton furnace is expected to be in operation by fall, with a capacity of 100 tons of ore per day.

NORWAY—As suggested by A/S *Norsk Bergverk*, the state mining corporation, a pilot plant will be built in conjunction with the Technological University at Trondheim. The Mutual Security Agency may make $200,000 available for the project. Bergverk also recommended that diamond drilling be continued at the *Dunderland* iron ore fields which are presently estimated to contain 150,000,000 tons of ore. The Ministry of Industry has proposed to Parliament that 2,000,000 kroner be appropriated for the drilling. Also included in the appropriation request was 200,000 kroner to test the value of nickel ore mined in Rana.

NETHERLANDS—The *Kempensche Zinkmaatschappy (Zinc de la Campine)* had a favorable year in 1951. Profits were 2,900,000 guilder, as compared with 2,600,000 in 1950. Production of zinc metal amounted to 22,603 tons, against 19,736 in the previous year. The company is also interested in a zinc mine in Morocco which looks favorable.

HUNGARY—Bauxite production is scheduled to be increased about 53 percent over that of last year, more than half of which will go to the Soviet Union. Aluminum production is also slated for an increase. Production last year is believed to have been about 33,000 short tons. The bauxite output in 1951 may have been between 300,000 and 400,000 short tons, according to a *New York Times* expert, making the planned bauxite output for 1952 between 450,000 and 600,000 short tons.

FRANCE—At the *Creil* plant of the *Societe Anonyme des Mines et Fonderies de Zinc de la Vieille-Montagne*, a New Jersey Zinc Company vertical retort installation made last fall is working smoothly. The plant produces ordinary zinc, high-grade zinc, and zinc oxide. The manufacture of zinc white powder has been transferred from the *Levallois-Perret* works to the Creil plant.

YUGOSLAVIA—A large manganese deposit is reported to have been located near the town of Jossani. It is said to be close to the surface and will be mined by open-pit methods.

ITALY—Uranium is reported to have been found near Genoa but no mention has been made of the quality or size of the deposit.

ENGLAND—The *Hemerdon* mine near Plymouth, owned by the *Ministry of Supply*, has been taken over by *English Clays, Lovering, Pochin & Company, Ltd.* who will act as managers for the Ministry. *Geevor* mine is reported to be maintaining its high rate of production. There are rumors that the *Lambriggan* lead-zinc mine is likely to reopen.

MEXICO—The North Shaft of *San Francisco Mines of Mexico* is down to the 16th level and indications are that the ore-bearing veins continue to that depth. During 1951, about 5,700 meters of underground work were carried out. Reserves reestimated at the end of September 1951 totaled 4,209,000 tons, equivalent to nearly six years' mill supply at the current milling rate. New agreements have been made with *Cia. Metalurgica de Penoles, S.A.* for the treatment of San Francisco's lead concentrates.

BOLIVIA—The present Bolivian government faces a most critical situation. On the one hand, no more foreign currency is available and none will be until a new tin contract is signed with the Reconstruction Finance Corporation; on the other hand, the miners and workers want higher wages, improvement of living standards, and nationalization of the mining industry.

BRAZIL—*Companhia Industrie e Comercia de Minerios* is reported to have signed a contract with the *Bethlehem Steel Company* for the sale of part of the manganese the company expects to be producing by the end of the year. Companhia Industrie e Comercia de Minerios is developing the *Macapa* deposits. An output of 300,000 tons is estimated for the first year's operation and 500,000 tons annually there after.

SURINAM—Manganese ore having a high content of cobalt and nickel is reported to have been found in the neighborhood of Brokopondo.

MEXICO—Mining is said to be reviving in the Galeana district of Nuevo Leon where deposits have not been worked for some time because of depressed conditions. In the *San Crescensio* mine, *Cia. Minera Nuevo Leon, S.A.* is reported to have reexamined the deposits and to have found silver and copper. Additional miners are being hired and a road is being reconditioned so that ore can be trucked over it to Monclova, Coahuila, for treatment.

PERU—Alberto Benavides Quintana has taken over the lease of the *Julcani* mine in the province of Huancavelica. The mine belongs to *Cia. Minera Suizo-Peruana S.A.*, but was leased to *Cerro de Pasco Corporation* for seven years, producing 100 to 150 tons per day of silver-bismuth ore. In the past it has also been a producer of gold, lead, and tungsten. Mr. Benavides, who was geologist in charge of exploration or Cerro de Pasco until he resigned to take over this lease, plans to maintain production on a similar scale and to sell his concentrates at Oroya.

CONSTANCIA MINE IN NICARAGUA

The Constancia tram terminal and, in the background, the new workmen's houses and bunkhouses are shown at the Constancia mine of the Neptune Gold Mining Company, Bonanza, Nicaragua. This mono-cable tram is seven miles long and has an hourly capacity of 31.25 tons. It operates at a rope speed of 500 feet per minute. The towers are all built of steel; the highest being 187 feet. Bucket capacity is 1,188 pounds of ore.

COLUMBIA—*Pato Consolidated Gold Dredging, Ltd.* will increase the digging depth of No. 3 dredge by 13 feet to a total digging depth of 80 feet below the water line. Materials are being assembled and the dredge will be closed down for three or four months while the change is being made. For the current year, a production of $5,700,000 is estimated (gold at $35. per ounce) from the dredging of 18,600,000 yards of gravel. Production for 1953 and 1954 is expected to continue at about the same rate, while in 1955 a drop to around $4,600,000 is anticipated. After 1955, production is expected to continue to decline to an estimated production of about $3,000,000 in 1958. Workable reserves are reported to be reduced to about 170,000,000 cubic yards by the end of 1958. With the smaller and shallower digging dredges closed down, the remaining reserves will be handled by the three large-capacity, deep-digging dredges.

MEXICO—The Navy Department has completed plans for construction of a special wharf at Tampico to handle metals and minerals for export. The wharf will cost 10,000,000 pesos ($1,150,000), and is expected to have a monthly revenue amounting to 3,000,000 pesos. These exports are now being routed through various parts in the southern United States. The department estimated that the new wharf will be able to handle 30,000 tons monthly, when an average of 200 railroad cars daily are assured. The wharf will also speed loading of steamers. At present it takes ten days to load a vessel at Tampico; the new facilities would do it in 48 hours.

VENEZUELA—*Bethlehem Steel Company* has launched another shallow-draft ore carrier, the Punta Cabrian, to be used to carry ore from Bethlehem's mine concessions on the Orinoco River to the tidewater port of Puerto Hierro. Here the ore will be transferred to ocean-going carriers for shipment to Sparrows Point Yard near Baltimore, Maryland.

BRAZIL—Important phosphate deposits have been discovered at Olinda in the state of Penambuco. First studies show that the area has about 30,000,000 metric tons of phosphorite, with an average of 20 to 25 percent P_2O_5. Technicians estimate that a reserve of about 100,000,000 tons is to be found. The deposits are similar to those of phosphorite in Egypt, but thicker and larger. Each layer has an average thickness of 2 to 4 meters.

ARGENTINA—An important economic study is being made of the marble deposits of Puesto Velez in the district of Cruz del Eje, considered the largest in the province of Cordoba. The survey shows known reserves of more than 3,000,000 tons.

BOLIVIA—The *Banco Minero de Bolivia* is reported to have contracted with *Messrs. Meissner* of Germany to finance equipment and machinery necessary for the erection of a dynamite factory in the department of Oruro. Payments will be made in shipments of minerals.

MEXICO—These mining companies were organized and registered in Mexico, D.F., recently: *Impulsora Minera de Mexico*, S.A., by Tito Ferrer and Manuel Jaidar; and *Cia. Minera Santa Anita*, S.A., by Agustin Dominguez and Ventura Garcia.

PERU—*Cia Minas del Peru* S.A. (*COMINAS*) has been formed to manage the Peruvian mining interests of *M. Hochschild and Company*. Operating mines at present are the Suquitambo gold mine in the department of Arequipa,

and the San Antonio de Esquilache lead-silver mine in the department of Puno.

CHILE—It is reported that the government of Chile has asked the copper mining companies to pay a levy in advance on future exports of copper. This payment would amount to about $15,000,000 and would be used to help meet the deficit in foreign currency presently confronting the government.

ARGENTINA—Monazite is reported to have been discovered in the sands of the Riecito Stream (San Luis province) in La Carolina. The occurrence is attracting much attention because it gives promise of an important new source of strategic metal.

MEXICO—The mint in Mexico, D.F. will be enlarged and modernized to enable it to keep pace with its orders for silver coins. A mint representative is in the United States shopping for machinery and equipment. The mint recently delivered 22,000,000 silver realis worth $6,000,000 to Saudi Arabia. Syria is reported to have a similar contract with the mint, and orders for silver minting are pending with Lebanon and the Dominican Republic. Some unnamed countries in South America are also reported to be negotaiting to have their hard money made in Mexico. Mexican mining and financial circles believe that this business will improve the silver situation in Mexico.

BRAZIL—A deposit of magnetite has been discovered in Serrote da Lage, Arapiraca, state of Alagoas. The ore has been estimated at 500,000 metric tons, in a depth of 50 meters, with an average of 53 percent iron, and 4.5 percent titanium oxide.

COLUMBIA—*Asnazu Gold Dredging Limited* reports that gravel reserves at the end of last year totaled 10,806,000 cubic yards, as compared with 19,495,000 cubic yards at the end of the previous year. During the year, 5,887,500 yards were dredged and, by recalculation, another 2,801,500 cubic yards were dropped because of low values and difficult digging conditions. Thus, the total decrease in reserves of 8,689,000 cubic yards. It is now anticipated that No. 1 dredge will continue to operate until toward the end of 1955, while No. 2 dredge will be permanently closed down in June 1953.

ASIA

JAPAN—The Japanese mining industry has gradually been rehabilitating its facilities and equipment and steadily expanding operations. For example, copper production in April reached 8,410 tons, the highest it has been in the last six years. Other production in April totaled as follows: zinc, 6,369 tons; lead, 1,504 tons; gold, 588 kilograms; tin, 64 tons; silver, 14 tons; and mercury, 7 tons. For the same month in 1951, production totaled: copper, 7,095; zinc, 4,781; lead, 1,482; gold, 469; tin, 33; silver, 13. Exploration, development, and waste-recovering operations have rapidly been extending over all the mining areas and smelters throughout the country.

TURKEY—A chromite deposit has been found at Pozanti in the Toros Mountains between Nigde and Adana. If preliminary speculations about the deposit are correct, its high grade and large reserves will make it comparable to the famous *Guleman* chromite mine. *Kromit Mine Company* operates the *Pozanti* mine.

INDIA—A chain of chemical and petrological laboratories is being set up by the Geological Survey of India in Bombay, Nagpur, Lucknow, and Madras to analyze and to conduct research on samples from mineral deposits of India. At present, there are only two of these laboratories, located in Calcutta, and these handle nearly 2,000 specimens every year. A goal of $2,500,000 has been set for the five-year development of the Survey. Its present strength of 176 officers will be increased to 275. The department is now engaged in the preparation of an accurate geological map of India, upon which all future geological work will be based. The old maps were prepared on a scale of four inches to one mile, and these will be changed to the standard scale of one inch to one mile.

JAPAN—The *Furukawa Mining Company*, one of the leading copper mining firms in Japan, has discovered a large deposit of zinc at its *Ashio* copper mine. The deposit shows ore reserves of 7 percent zinc, (in marmatite), along with 24 percent sulphur in the form of pyrrhotite and pyrite. 150 tons a day is now being mined from the deposit. Newly es-

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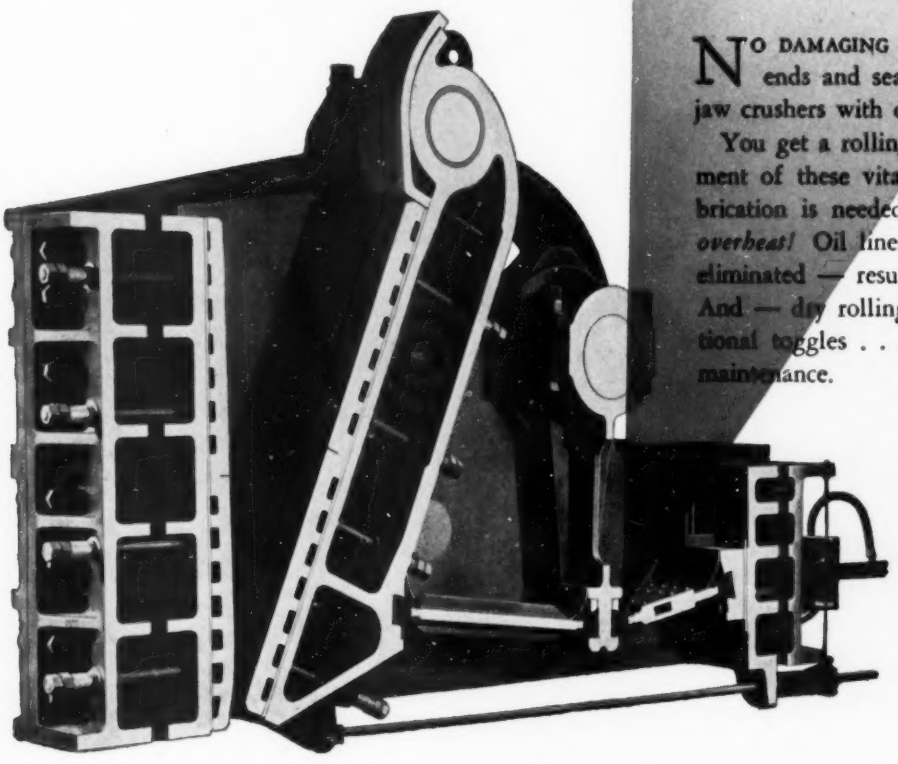

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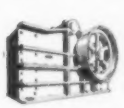
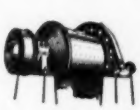


Jaw Crushers

Gyratory Crushers



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tablished flotation equipment is producing 500 tons a month of 48.76 percent zinc concentrates, and 1,500 tons per month of 38.22 percent pyrite concentrates.

TURKEY—A new iron mine has been opened near Edremit on the Agean Sea. Within a year, it is expected that 200,000 tons of ore will be exported from the mine to Italy.

PAKISTAN—An important event in the industrial development of the country was the opening in May of the Central Testing and Standards Laboratories. The present laboratories, though on a smaller scale than originally planned, are stated to be in a position to test ores, minerals, steel, metals, cements, and so forth. At present, Pakistan is exporting chromite in the form of crude ore. One of the first problems the new laboratories will tackle will be to find a method of utilizing this ore within the country—perhaps by setting up refining and concentrating plants, or by producing commercially economic chemicals, such as dichromates, which are required in increasing amounts for the country's tanning industry.

JAPAN—Two major Japanese firms report that Britain is interested in buying about 65,000 tons of steel products from Japan. *Yawata Iron & Steel Manufacturing Company* and the *Fuji Iron & Steel Company* claim that the *British Iron & Steel Corporation* has been negotiating for the products.

MALAYA—*Reuter's* reports that shipments of tin from Malaya in May decreased by 2,467 tons over the amount shipped in the preceding month. Of the 4,573 tons exported, 1,107 tons went to the United Kingdom, 1,235 tons to the United States, 1,681 tons to the European continent, 130 tons to Canada, 121 tons to India, and 165 tons to South America.

TURKEY—Tests are underway at Murgal to determine the SO_2 content of smelter gases for possible use in a sulphuric acid and super phosphate plant which will be built there.

INDIA—The World Bank is preparing to assist India in the production of pig iron and steel if the proposed projects are found to be sound both financially and productively. India's expansion program includes a new $60,000,000 pig iron plant, a $170,000,00 steel plant, and the expansion of the *Tata Iron and Steel Company* and the *Steel Corporation of Bengal* at a cost of about $6,000,000.

JAPAN—Japan is said to have resumed trading in silver for the first time in 15 years. A spokesman for the Japanese mining industry reports that the annual production will average about 150 tons, with about 10 tons of this available for export. Government reserves total about 200 tons at present, he states, and with the return of silver by the occupation authorities, some of these reserves might also become available for export. He said that free trading in platinum has also been restored but government allocation remains.

TURKEY—The *Etibank* has decided to operate the *Keban* lead mine. Preparations are being made to produce lead concentrate at first, and smelting facilities may be added later. Etibank's next undertaking will be to develop the *Bolkardag* lead mine.

NEWFOUNDLAND — The Government of Newfoundland has passed an act enabling it to take control of privately held undeveloped mineral areas in Newfoundland and Labrador and to secure their development. Title of areas concerned would remain in the hands of the present title holders. The move was taken in view of the current interest in Newfoundland mineral potentialities by large outside mining companies in both the United States and Canada. The holdings of several companies are exempt from the bill. These are: *Buchans Mining Company, Anglo Newfoundland*

Development Exploration Company, Falconbridge Limited, Frobisher Limited, Labrador Mining & Exploration Company, Dominion Steel & Coal Corporation, Nova Scotia Steel & Coal Company, St. Lawrence Corporation of Newfoundland, Newfoundland Fluorspar Company, and *Newfoundland Asbestos Limited.*

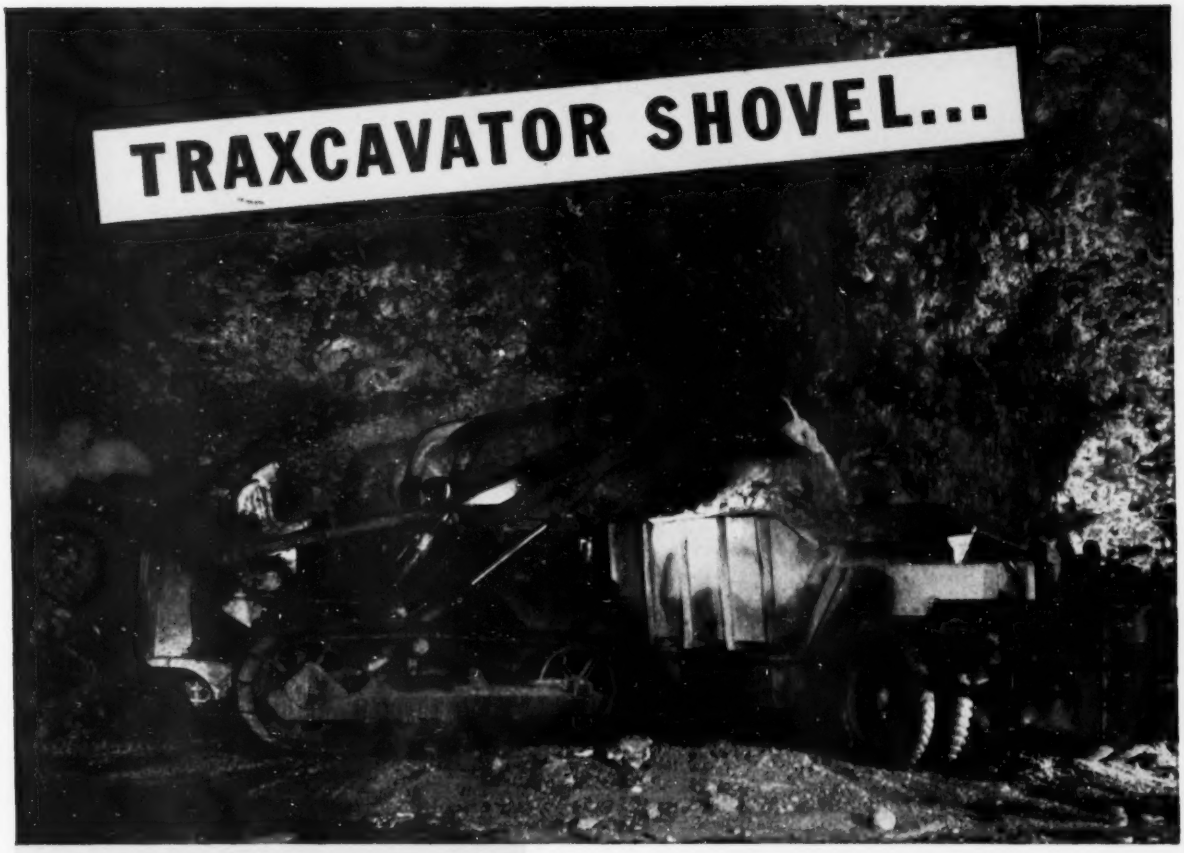
SASKATCHEWAN—Over 9,000 feet of diamond drilling on properties of *Charlebois Lake Uranium* in Northern Saskatchewan has reportedly disclosed exceptional widths of a medium-grade uranium ore. An expenditure of a further $100,000 or more for additional drilling is proposed this year. Surveys this summer will extend the mapped portion and further drilling will be undertaken as results may warrant.

BRITISH COLUMBIA—The *Sil Van Consolidated Mining and Milling Company* reports very good progress in its preparations for starting production this fall with a mill of 150 tons daily capacity. Foundations for the coarse ore bin have been completed and crusher foundations are being poured. Site for the grinding and flotation section of the mill has been cleared and bulldozed and construction will start as soon as foundations are poured. A steel powder house has been completed. Development work has disclosed ore over a vertical range of 450 feet. A new ore shoot is reported on the highest level at 4,250-foot elevation and also on the bottom level at 3,800-foot elevation. Sampling of the main ore shoot on the top level shows continuous ore for 130 feet. Averages for this distance are reported as: width 1.8 feet; gold 0.14 ounces; silver 9.6 ounces; lead 6.5 percent; zinc 13.3 percent. Several other short shoots are also indicated which are high in gold content but low in lead and zinc.

QUEBEC—*United Asbestos Corporation* is getting ready to sink a second shaft on its property. All necessary equipment is reported to have been delivered and the new shaft operation will begin very soon. Meanwhile, a long drive at the 540-foot level has opened an entirely new ore body. Further work has to be done to determine its tonnage possibilities. Drilling suggests a length of at least 1,700 feet. Approximately 55,000 tons of ore has been stockpiled on the surface dump. This was taken from underground development work and represents 10,000 ft. of lateral work.

NEW BRUNSWICK—The *Currie's Mountain-Williams Manganese Syndicate* has been formed by a local group in Fredericton to carry out exploration and development work on an 18-square mile area in the Currie's Mountain section outside of Fredericton. Preliminary

THE MARKET PLACE



WRECKS RECORDS

ON EAGLE-PICHER MINING OPERATION!

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HT4 Breaks Own Record By Loading 1270 Tons!

In seven hours of hard work, the HT4 TRAXCAVATOR Shovel in the West Side Mine of Eagle-Picher Co. loaded 1270 tons of tough lead and zinc ore—beating its old record by 300 tons! **This is a new high for loading units at Eagle-Picher's mines! The fast-stepping HT4 is one of four TRAXCAVATOR Shovels owned by this famed company. In addition to stepping up production, costs have been lowered, as the average cost of loading a ton of the vital ore has dropped to 13.6¢.**

Wherever tough conditions and high production quotas must be met, TRAXCAVATOR Shovels are first choice. They are built to stand up to the job, to turn out steady work hour after hour, to make money on mining operations!

Let your "Caterpillar" Dealer give you complete details on the TRAXCAVATOR Shovel model that fits your mine's needs. There are five models with capacities to 4 cu. yds.—all proved for profit-making ability. Call on your dealer or write direct.

surveys of a potential manganese development are slated to get under way soon under the direction of Robert Hossack of Saint John, N.B. Members of the syndicate are Alfred E. Williams, John J. Hogan and Dr. Grover C. McCoy.

QUEBEC—The *Quebec American Zinc Refining Company* is reported to be planning development of a $12,000,000 zinc refinery in Chicoutimi, about 140 miles northeast of Quebec City. Work on the project is expected to start as soon as materials and machinery are delivered.

BRITISH COLUMBIA—*Giant Mascot Mines, Ltd.* is boosting milling capacity at its *Spillimacheen* property to between 450 and 500 tons per day. An auxiliary grinding unit has been added, along with two new flotation units and a zinc circuit, classifier, and filter. Ore reserves are estimated at 500,000 tons, grading 5.1 percent lead.

ONTARIO—A fourth converter has been installed by *Falconbridge Nickel Mines Ltd.* and the installation of a third blast furnace will start this fall. When both are completed, production should be increased to 30,000,000 pounds annually. The present rate is close to 28,500,000 pounds. Mine expansion is proceeding on a large scale and exploration of the new Fecuni Lake orebody is continuing.

MICHIGAN—The solution to the problem of economic production of electric power from atomic energy with simultaneous manufacture of vitally needed plutonium is believed to have been found. A scientific team from the *Monsanto Chemical Company* and the *Union Electric Company* of Missouri has recommended design and construction of a pilot plant for a moderated type of atomic reactor. The two companies have recommended that the Atomic Energy Commission design and build the plant so that these technical theories can be checked.

QUEBEC—At the *Suffield* mine of *Ascot Metals Corporation Ltd.*, the third level station cutting has been completed and the shaft bottom is presently 75 feet below this horizon. The immediate objective is another level at 560 feet and a further 60 feet of shaft for use as a sump and as the basis of a start for further sinking operations. Thirteen stopes have now been prepared or are in the process of mining to the second level and underground development is continuing at the highest possible rate cosistent with mining conditions. A company surface diamond drill is presently being made ready to resume drilling of the unexplored sections of the Suffield "break" to determine the full potential of the ore deposits and the proper means of development. At the *Moulton Hill* mine, development and mining of the ninth and tenth levels is proceeding at normal rate; 250 feet of ore opened in the tenth level South drift is the best encountered in some time. Concentrator tonnage is ranging from 600 to 650 tons which will be increased to 700 tons as mining conditions permit.

ALASKA—The U. S. Geological Survey has established a new regional mining office of the Conservation Division for the Territory of Alaska, at Anchorage. Leo H. Saarela has been appointed regional mining supervisor and will be in charge of the Anchorage office. The mail address is P. O. Box 259, Anchorage.

ONTARIO—The new internal shaft of *Delnite Mines* has been completed and work on the lower levels has started. It is expected that an extension of the higher grade ore from the adjoining mine will be found on the Delnite upper levels. *Sylvanite Gold Mines Ltd.* owns a two-thirds interest in Delnite.

QUEBEC—The Arvida plant of *Aluminum Company of Canada* will increase its production of magnesium by 1,000 tons per year, or from 3,000 to 4,000 tons annually. The program of expansion will cost $2,000,000. An agreement with the British government gives the latter first call on 2,640 tons annually for 20 years.

ALASKA—Resumption of chromite mining on claims now owned by Mike E.

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Readers of this section will be interested!

MINING WORLD subscribers, among whom are many of your friends, want to know what you are doing now.

Let's hear from you!

Siler at Red Mountain near Seldovia, Alaska, is reported by the Alaska Development Board. The mine produced chromite during World War II and is said to be planning to increase that output when operations are resumed.

CALIFORNIA—The lease-and-option-to-purchase agreement formerly held by *Penn Chemical Company* on the *Penn* mine at Campo Seco, California, has been assigned and transferred to *New Penn* Mines, Inc. The new firm has been organized by *Goldfields American Development Company Ltd.* for the purpose of developing the famous old mining property.

QUEBEC—*Waite Amulet Mines Ltd.* expects regular production from its East Waite orebody shortly at the rate of 700 tons per day. Since the start of this year, diamond drilling has indicated an additional 61,000 tons of ore assaying 4.0 percent copper and 4.5 percent zinc.

BRITISH COLUMBIA—*Reeves MacDonald* mine in British Columbia's Metalline area is currently milling more lead-zinc ore than any other company ever did in that province, with the exception of *Consolidated Mining & Smelting Company*, according to Ray Jones, superintendent. The property's output is 25,000 tons of concentrates monthly.

ONTARIO—*Penn-Cobalt Silver Mines* reports intersection of 19 inches of cobalt and calcite vein has been secured in a drill hole which passed through No. 7 vein at its Kerr Lake Mine at a location 20 feet below the 90-foot level. Mine manager J. H. Price, reports that the cobalt content was exceptional with 60 percent of the core massive cobalt, the balance being disseminated. Number 69 hole is now being continued to test a silver vein which lies about 15 ft. ahead in the 90-foot level drift.

BRITISH COLUMBIA—After a two-year shutdown, the *Engineer* mine on Tagish Lake about 35 miles from Atlin, British Columbia may reopen again this year. The mine is owned by Walter Sweet, Neil Forbes, and T. J. Kirkwood, who plan to install machinery and put it back into operation.

QUEBEC—*New Goldvue Mines* reports gold ore higher in grade than any previously found in the mine has been opened up at the 800-foot level. This new section has been opened for 100 feet with the present face apparently in the best material yet encountered by the drift.

SASKATCHEWAN—The *Hudson Bay Mining & Smelting Company* has established a record in claim-staking in Saskatchewan at Mystic Lake, about 10 miles south of Flin Flon. The claims, covering approximately 8,350 acres or 13 sections, were staked by prospectors sent out by *Hudson Bay Exploration & Development Company*, Hudson Bay's wholly owned exploration organization. The staking suggests that the company has made a significant new mineral discovery.

ONTARIO—The *Silanco Mining & Refining Company* reports new ore at the 200-foot level of its *Aguanica* mine in the drive to open the new silver-cobalt vein below Lake Timiskaming. This drive will traverse 750 feet of virgin ground before reaching its objective. The company has also completed arrangements to lease from *Nipissing-O'Brien Mines Ltd.*, on a royalty basis, the party wall between Silanco's *Colonial-Violet* mine and rich, adjoining O'Brien mine. Plans call for opening the new ground from the Colonial 930-foot level. This will facilitate exploration of the undeveloped lower portion of the Violet mine.

SASKETCHEWAN — The *Eldorado Mining & Refining Company*, reports that construction is well under way on its new mill which is to have a 500-ton daily capacity. The mill will employ a new leaching process which will give a very high recovery of uranium. Eldorado's future mining plans include the incorporation of headframe repair shops and miners' change house in a single building. The company is continuing its surface exploration to the northeast of its mines and has a diamond drilling program lined up for its recently acquired *Radiore* property.

OREGON—Metallurgists of the *United States Bureau of Mines* at Albany, Oregon, are producing tin cheaply from a hitherto useless byproduct which had previously been in inactive stockpiles of another government agency. The material is said to be a mixture of metals, chiefly tin and copper. Metal anodes are formed after oxidized material is driven off by melting the scrap in a furnace. An electric current, passing through a solu-

U.S. METAL & MINERAL MARKETS

METALS

JULY 15, 1952

COPPER:	Electrolytic. Delivered F.o.b. cars, destination U.S.A.	24.50¢
	Lake. Delivered, destinations U.S.A.	24.625¢
	Foreign Copper, New York	35.50-36.15¢
LEAD:	Common Grade. New York	16.00¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton	$202.95
ZINC:	Prime Western. East St. Louis	15.00¢
	Tri-State Concentrate, jig, flotation 60% zinc, per ton	$100.00
ALUMINUM:	Primary 30 pound Ingots (99% plus). F.o.b. shipping points	19.00¢
ANTIMONY:	Bradley Mining Co.'s Elk Brand 99.5%. F.o.b. Cascade, Idaho	39.00¢
	Lone Star Brand. F.o.b. Laredo, in bulk	39.50¢
BISMUTH:	(In ton lots) price per pound	$2.25
CADMIUM:	Sticks and bars. 1 to 5 ton lots (Price per pound)	2.25
COBALT:	97-99%, keg of 550 pounds (Price per pound)	$2.40
MAGNESIUM:	Ingots (99.8%). F.o.b. Freeport, Texas	24.50¢
MERCURY:	Flasks. Large lots, New York	$193.00
NICKEL:	"F" Ingots (5 pounds). F.o.b. refinery, Port Colburne, Ontario	56.50¢
TIN:	Grade A Brands. New York (Price per pound)	121.50¢
TITANIUM:	99.3% + (Price per pound)	$5.00-7.00
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	Newly mined domestic. United States Treasury price	90½¢ per ounce
	Foreign. Handy & Harman	82.75¢ per ounce
PLATINUM:		$105.00 per ounce

ORES AND CONCENTRATES

BERYLLIUM ORE:	10 to 12% BeO. F.o.b. mine, Colorado	$36.00 per unit
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3.	$43.00-$44.00
	African (Transvaal). 48% Cr_2O_3.	$34.00-$35.00
	Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$53.00-$54.00
	U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports.	
	Mesabi, Non Bessemer, 51.5% Fe	$ 8.30
	Mesabi, Bessemer, 51.5% Fe	$ 8.45
	Old Range, Non Bessemer	$ 8.55
	Old Range, Bessemer	$ 8.70
MANGANESE ORE:	Metallurgical grade. 46 to 48% Mn. Long ton unit	$1.15-$1.23
	Chemical grade. 80% MnO_2. Per ton	$70.00
	Chemical grade, domestic, 70% MnO_2, F.o.b. mines	$45.00
	U. S. Government ore purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treatment costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; base price of $6.05 per long dry ton of 12% manganese ore. Phillipsburg, Montana; base price of $6.43 per long dry ton unit of 15% manganese ore. Metallurgical grade manganese ore program. Small lots f.o.b. railroad cars, minimum 40.0% manganese. Base price (48.0% Mn) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS_2. F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.00
TUNGSTEN CONCENTRATE:	60% WO_3. Per short ton unit	$65.00
URANIUM ORE:	Carnotite-Roscoelite. F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita, and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	Carnotite-Roscoelite. V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock.	

NON-METALLIC MINERALS

BENTONITE:	Minus-200-mesh. F.o.b. Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	Metallurgical grade. 70% effective CaF_2 content per short ton F.o.b. Illinois-Kentucky mines	$42.00-$43.00
	Acid grade. 97% CaF_2	$60.00
PERLITE:	Crude: F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants per short ton	$7.00 to $9.00
	Concrete grades. Crushed and sized	$6.00 to $8.00
SULPHUR:	Long ton, F.o.b. Gulf Coast mines	$22.00

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

tion of sodium hydroxide, dissolves tin from the anodes and deposits it on steel cathodes. Tin crystals are stripped from the cathodes, remelted, and cast into 50-pound ingots of high-purity tin.

YUKON TERRITORY – Depelopment work will be conducted by *Yukon Placers Inc.* on tungsten property on the Seward Peninsula and copper property on Fidalgo Bay. Three placer camps will also be operated this season. Leonard Stampe, who closed operations on Jack Wade Creek in the Forty Mile area last year, will mine placer gold this season on Highet Creek in the Mayo district; Glen Franklin and Harold Schmidt will have charge of the Sixty Mile property; and Al Stout will be in charge of the Ballerette Creek operations.

QUEBEC—*Noranda Mines* of Rouyn. Quebec is contemplating a number of projects over the next three years, according to President J. Y. Murdoch. A total of $37,000,000 is to be raised by the company of which $25,500,000 will be for a Gaspé Copper project. Plans call for the construction of a mill and smelter which is proposed to treat 6,500 tons daily. Noranda also plans to build a sulphur-iron plant in the Niagara Peninsula. Construction work is not expected to start until 1953. This plant is expected to treat approximately 100,000 tons of pyrite concentrate annually and to produce some 72,000 tons of premium iron-grade sinter for sale to steel companies. Noranda Mines is also giving consideration to participating in the construction of a zinc smelter in Quebec.

ALASKA—The *United States Tin Corporation* has received certification from the DMPA for construction of a 26.5-mile mine access road to its tin and tungsten property in Alaska.

SASKATCHEWAN—Plans are now being completed by the Saskatchewan Government for the construction this summer of Uranium City which is to serve as the residential center for Saskatchewan's extensive uranium development areas north of Lake Athabasca, straddling the Alberta-Saskatchewan border. Selection and official naming of the site near Martin Lake has marked the first step in the establishment of the town which is to cover 150 acres of flat, sandy land along the Fredette River. Uranium City will serve as a central townsite for all mines in the area instead of each property having its separate communities. Housing regulations will be enforced to prevent development of a shack town. It is estimated that by 1958 Uranium City will be a bustling community of 5,000 population. The Transport Department and *Eldorado Mining and Refining Company* have completed an airport six miles from the townsite. Eldorado, the Crown Corporation which purchases all uranium produced in Canada, has announced that it definitely has a uranium mine at its *Ace Lake* property near Beaverlodge Lake.

IDAHO—Five mining companies have consolidated their interests in a 162-acre tract between the *Silver Summit* and *Sunshine* mines in Idaho, to be known as the "New Purim Area," and have divided ownership in the entire area on a percentage basis. Participating are *Hayden Hill Consolidated Mining Company, Lincoln Mining Company, Silver Dollar Mining Company, Poloris Mining Company*, and *Silver Summit Mining Company*. They will explore for the westerly extension of the rich silver vein being mined in several places in Silver Summit ground.

ENGINEERING BOOKS:

Views and Reviews

A HISTORY OF PHELPS DODGE (1834-1950). By Robert Glass Cleland, Alfred A. Knopf, New York, New York. 1951. 307 pp., 27 pictures, 31 page appendix containing officers, subsidiary companies, operating and management personel at various departments and divisions and a record of production. $4.00.

Phelps Dodge runs deep into the nation's past, nearly 150 years, to a small saddle-making shop in Hartford, Connecticut. This book deals largely with the men—Anson Greene Phelps, William E. Dodge, James Douglas, Arthur Curtiss James, and Louis S. Cates—who have contributed so much to Phelps Dodge.

The importance of the acquisition of the Calumet and Arizona Mining Company, and United Verde Copper Company by Phelps Dodge is emphasized as it "gave Phelps Dodge a comfortable margin of ore reserves over current needs for some years to come." Morenci, to become the greatest mine was purchased from the Arizona Copper Company in 1921.

The efficiency of present operations is diagrammatically shown so that any non-technical reader can visualize the one ton of 1.0 percent copper ore forming a 2-foot 3⅞-inch cube from which a 9-inch cube of 30.0 percent copper concentrates is recovered. From this a 3.79-inch cube of 99.60 percent blister copper is formed. For the first time the accomplishments of the fabricating subsidiaries during World War II are told.

As for the future, the new Lavender pit and exploration at the Burro Mountain Branch point to maintenance of "a comfortable margin of ore reserves."

ELECTRONIC MANGANESE AND ITS ALLOYS. By Reginald S. Dean, Ronald Press Company, New York, New York, 296 pp., $12.00.

This is a review of the production and development of electrolytic manganese since 1936 when a practical method of production was first introduced. The Author has assembled much information which should help to facilitate the contributions by domestic manganese to our economy and security. This book should prove of value to mining, metallurgical, and chemical engineers, to makers, fabricators, and users of light metal alloys, to electroplaters, and to power engineers.

Copies of any of these books may be purchased from *Mining World*, 121 Second Street, San Francisco.

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

New Jet Machine Pierces Bigger Blast Holes

The new JPM-3 jet-piercing machine, developed by Linde Air Products Company for use in the Babbitt, Minnesota property of the Reserve Mining Company, is the successor to the JPM-1 now

in operation at the Erie Mining Company's taconite mines at Aurora, Minnesota.

Improvements designed into the JPM-3 are the result of extensive experimental piercing performed with earlier models since 1949. The maximum size of primary blast holes pierced at about the same speed has been increased from a nominal 6½-inch diameter and 35-foot depth to 7⅞-inches by 47 feet. In addition, piercing progress with the new machine is controlled automatically by electronic descent controls. For further information, circle no. 67.

New Rear Dump Wagon Is Hydraulically Operated

The TR200 Motor Wagon, an hydraulically operated rear dump wagon, has been added to the LaPlante-Choate line of earthmoving equipment. The two-wheeled, rubber-tired tractor that powers the wagon is the same tractor used with the TS200 Motor Scraper. It's available with a 165-hp. Cummins or a 176-hp. Buda; both six-cylinder diesels.

Scraper and wagon units are interchangeable. Each uses the same hydraulic system.

One of the outstanding features of this new unit is the stable wheel base—four wheel air brakes make it possible to back the unit over the edge of a dump with complete safety.

An obstruction-free body interior plus a 70° tilting angle assures the complete and easy discharge of all types of materials. The Motor Wagon, built throughout for strength and wearing quality, has a top speed of 22 miles per hour. Request form no. 1306 by circling no. 72.

New Discharge Feeder Moves Sticky Material

The Pulva Corporation has come up with a new type of bin discharger, field tested for over a year, designed to move sticky, viscous or plastic materials from bins and hoppers at a uniform rate

The new discharger, called a Com-Bin Feeder, is a cylindrical shell

mounted on a rotating vertical shaft. Below the cylinder, mounted on the same shaft, is a circular plate larger in diameter than the cylinder. As the cylinder and plate rotate, a stationary plow, mounted in a gap between the cylinder and the plate, continuously removes a stream of material from the bottom of the mass in the cylinder, discharging it off the edge of the plate. Discharge rate can be varied by varying the thickness of the plow, the distance the plow extends into the cylinder, and the speed at which the entire feeder turns. For further information on Com-Bin feeders, circle no. 73.

Wall Chart Offered For Feet-Meter Conversions

The firm of Robert S. Mayo, Civil Engineer, has designed a wall chart for the

FEET TO METERS

1 ft. = 0.3048006 m

	0	1	2	3	4	5	6	7	8	9
0		0.3048	0.6096	0.9144	1.2192	1.5240	1.8288	2.1336	2.4384	2.7432
10	3.0480	3.3528	3.6576	3.9624	4.2672	4.5720	4.8768	5.1816	5.4864	5.7912
20	6.0960	6.4008	6.7056	7.0104	7.3152	7.6200	7.9248	8.2296	8.5344	8.8392
30	9.1440	9.4488	9.7536	10.0584	10.3632	10.6680	10.9728	11.2776	11.5824	11.8872
40	12.1920	12.4968	12.8016	13.1064	13.4112	13.7160	14.0208	14.3256	14.6304	14.9352
50	15.2400	15.5448	15.8496	16.1544	16.4592	16.7640	17.0688	17.3736	17.6784	17.9832
60	18.2880	18.5928	18.8976	19.2024	19.5072	19.8120	20.1168	20.4216	20.7264	21.0312
70	21.3360	21.6408	21.9456	22.2504	22.5552	22.8600	23.1648	23.4696	23.7744	24.0792
80	24.3840	24.6888	24.9936	25.2984	25.6032	25.9080	26.2128	26.5177	26.8225	27.1273
90	27.4321	27.7369	28.0417	28.3465	28.6513	28.9561	29.2609	29.5657	29.8705	30.1753

Inches to Meters 1" = .02540003 m

1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"
.0254	.0508	.0762	.1016	.1270	.1524	.1778	.2032	.2286	.2540	.2794

1/8"	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"
.0032	.0063	.0095	.0127	.0159	.0190	.0222

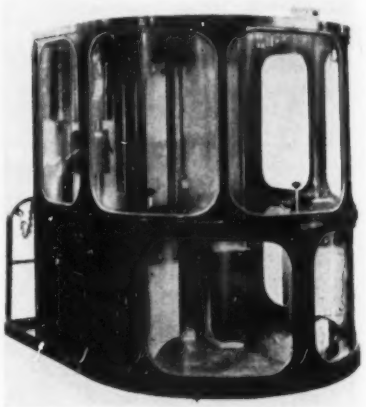
rapid conversion of feet to meters and vice versa. These handy tables are offered free on the request of interested mining men and engineers.

The Mayo organization, internationally famous in the design and manufacture of steel sets, pneumatic grouters, jumbos, cherry pickers and mine cars, has published bulletins describing in detail the specifications and uses of grout and steel sets with special emphasis on underground applications. For copies of these bulletins and a metric wall chart, circle no. 79.

Plastic Crane Cab Windows For Clarity and Safety

Windows for the cabs of Harnischfeger cranes and excavators are now being glazed for maximum clarity and safety with CR-39 cast plastic sheets, a product of the Cast Optics Corporation.

The new cab windows have a light transmission factor of 92 percent and are



claimed to be completely resistant to both mechanical and chemical cracking. Whether the cranes are used indoors or out, safety to the operator is made doubly sure by the high resistance of these plastic sheets to impact and the spatter of molten metals. Circle no. 74.

NEW CLEANER FOR MINE DRYS: For quickly cleaning dry and change houses, use Berman Chemical Company's new Saf-T-Klenz. It removes grease, oil, dirt, and grime by a chemical action harmless to clothes, skin, floors and drains, and leaves no slippery film. Circle no. 1.

PLACER AND SOIL SAMPLING: The Acker Drill Company's 16-page bulletin no. 25 illustrates and describes a wide variety of equipment for use in placer and soil sampling. Included are solid-tube, split-tube, and thin-wall samplers; spiral augers; interchangeable shoes; trap valves; and even the minor items you'll need for your sampling kit. Circle no. 2.

FASTER BEARING INSTALLATION: Link-Belt's two-piece housing for ball and roller bearings makes mounting and assembling fast and simple. Standard threaded bolts serving as jack screws raise the housing cap for the quick installation of adapter rings. Engineering data is supplied in bulletin no. 2550. Circle no. 3.

BUDA DIESELS FOR TOUGH GRADES: The extra horsepower and greater lugging ability of Buda's big Diesels are lowering haul costs and increasing output in many of the world's largest open pits. Descriptive Buda bulletins are available. Circle no. 4.

SAVE WITH KVS CRUSHERS, GRINDERS: Now available is a complete set of bulletins explaining the unique money-saving features of Kennedy-Van Saun jaw and gyratory crushers and ball and tube mills. Circle no. 5.

TRUCO BITS ASSURE HIGH FOOTAGE: The carefully set diamonds in the bits made by the Wheel Trueing Tool Company deliver maximum cutting power for increased footage. For further information, circle no. 6.

COTTRELL HANDBOOK: The Western Precipitation Corporation, pioneers in the commercial application of Cottrell precipitation, has published a 28-page handbook available to engineers and operators interested in the problems surrounding the recovery of dust, fumes, and ash from gaseous suspensions. Circle no. 7.

CLOSE CONTROL BY AIR SEPARATION: The air separators made by the Sturtevant Mill Company provide simple, precise regulation of both centrifugal forces and air currents, insuring the maximum capacity for a product of nearly any desired fineness. Circle no. 8.

MINING CATALOG: Increase drill footage by learning the specifications and applications of the many types of drill bits now available. Get Christensen Diamond Products' newly-published Mining Catalog by circling no. 9.

IMPROVED BATTERY LOCOMOTIVES: Double-reduction spur gear drives and anti-friction bearings are only two of the features that provide efficient underground haulage with Atlas storage battery locomotives. For complete information on the application of Atlas products as described in their catalog by circling no. 10.

HIGH CORE RECOVERY WITH NEW DRILL: The rugged new model 40-C, Sprague and Henwood's latest diamond drill, is designed for high core recovery to depths of 1000 feet. A descriptive catalog covering the 40-C is available by circling no. 11.

FAST, SIMPLIFIED PIPING: Victaulic pipe, designed around the only completely modern development in leak-proof fittings, is field-tested insurance of quick, low-cost, long-life installations. Get Victaulic's engineering manual 44-8C by circling no. 12.

MORE VENTILATING AIR PER HP: The Coppus Engineering Company is the only firm that makes both centrifugal and propellar type air blowers for compressed air or electric motor drives. Mine tests show that the correct selection from this versatile line will increase air output up to double that possible with all-purpose units. For a copy of bulletin 130 on Coppus blowers, circle no. 13.

ENGINEERED DUST CONTROL: By lowering maintenance costs, clean-up expense and down time, efficient dust control is an important plant investment. American Air Filter Company's engineering bulletin no. 277 is a helpful guide in the design and installation of dust control systems. Circle no. 14.

EASY-HANDLING PLASTIC PIPE: Carlon pipe conforms to irregular contours, requires few fittings, has smooth scale-proof internal surfaces, is guaranteed against rot, rust and electrolytic corrosion and 250 feet of 1½-inch pipe weighs only 80 pounds. What more do you want in low-pressure lines? For illustrated bulletins, circle no. 15.

HI-POWERED AIR-DRIVEN DIAMOND DRILLS: Chicago Pneumatic's CP-55 diamond drill has the most powerful rotary air motor on any diamond drill. With a capacity of 500 feet of hole, the CP-55 is an outstanding performer in high-speed underground drilling. Get bulletin 318-2 by circling no. 16.

LONG-LIFE WIRE SCREEN: Flat-lying, oil-tempered wire gives Roebling screens long life with less logging and blinding by presenting 75 percent more wearing surface. For information on the types and sizes offered by Roebling's Wire Fabrics Division, circle no. 17.

SAFER, FASTER CAR COUPLERS: Willison automatic couplers require no manual assistance in either coupling or uncoupling—an important factor in mine safety. Either end of a car can be the front with these symetrical units—no lost time in reversing. Close coupling prevents damaging slack. Circulars nos. 1746 and 5240 have the details. Circle no. 18.

HI-STRENGTH BELT FASTENERS: Flexco fasteners and rip plates for making butt joints, bridging soft spots and patching or joining rips have the strength and durability required by heavy conveyor and elevator belts. The even strain distribution and natural troughing characteristics of Flexco fasteners are explained in bulletin F-100. Circle no. 19.

HI-POWER SCINTILLOMETER: The scintillometer made by the Engineers Syndicate, Inc. detects nearly 100 percent of gamma ray emission—one hundred times as sensitive as the Geiger counter. For complete information, circle no. 20.

BEARING CATALOG: The Shafer Bearing Corporation has published a new catalog on the specifications and industrial applications of its complete line of bearings. Circle no. 21.

LATEST BATTERY IMPROVEMENT: Exide, the battery featuring corrosion-resistant Silvium alloy, now comes with a polythene insulating tube sealer. For further details on the new Exides, circle no. 22.

PORTABLE DEEP DRILL: Boyles Brothers new BBS-4 diamond drill has a high

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speed capacity up to 5000 feet and is specially designed to take a Kelly drive for rotary drilling. For information, circle no. 23.

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FULL POWER WITH MISALIGNED SHAFT: Thomas flexible shaft couplings prevent the usual troubles caused by badly aligned shafts with patented flexible discs. Get the engineering catalog on the wide range of Thomas couplings by circling no. 25.

FREE-FLOWING BIN UNIT: No need for clogged and hammer-damaged bins and hoppers with Syntron's electric bin vibrators. For the Syntron illustrated catalog, circle no. 26.

WIDE THROAT SLUSHER SHEAVE: Built specifically for slusher mining, the Skookum 708S block features a wide throat for knotted lines and special alloys for heavy duty. Circle no. 27.

INCREASE FLOTATION RECOVERY: PQ soluble silicates depress siliceous slimes in flotation cells to give a cleaner, purer concentrate. Laboratory test samples and further information will be sent those circling no. 28.

PRODUCTION-EERED LINKS: Quaker shaft links are rubber-cushioned to prevent shocks and vibrations from being transferred to prime movers driving crushers, and other heavy-duty equipment. Get Quaker's new booklet, "Production-eered," by circling no. 29.

PAYLOADER—THE MINER'S HANDY-MAN: The big 1½-yd. model HM Payloader has proven itself a valuable and versatile earth mover in and around mines and mills. It can excavate, strip, load, backfill, bulldoze, spread, pull, push, lift and carry. A Payloader catalog describes this and smaller units. Circle no. 30.

NO MORE GOB-CUT CABLES: Expensive and essential cables and hoses can be surely and safely kept out of muck and gob with Elreco J-hooks. Get price and delivery information by circling no. 31.

DUST CONTROL ENGINEERING SERVICE: If your problems include dust recovery, get the descriptive literature on Western Precipitation's complete facilities and services, based on years of experience with both mechanical and electrical methods, by circling no. 32.

SIZING AND DEWATERING WITH SCREENS: Simplicity gyrating screens increasing production potentials on the great Mesabi iron range by fast, efficient service in sizing and dewatering. For further information on these and other applications, circle no. 33.

NEW TWO-STAGE PORTABLE COMPRESSOR: Gardner-Denver has designed a new compressor for 600-foot capacity and portability over rough terrain. Circle no. 34.

COST-CUTTING HANDBOOK: A new 16-page handbook published by the Alloy Rods Company shows by illustrations, tables, and text the methods of reducing repair and maintenance costs in mining and milling operations. Get your copy by circling no. 35.

LATEST ON LAB EQUIPMENT: The latest descriptive literature and price lists on Denver Fire Clay's immediately available laboratory crushers and pulverizers will be sent to those circling no. 36.

BIGGER PAY LOADS: Landis trailers, designed for on or off-highway use, have all-welded construction to reduce tare weights and increase the pay loads. For the new trailer bulletin on Landis units, circle no. 37.

NEW HAULAGE DESIGN DATA: The proper design of underground haulage systems will increase production and prevent expensive bottlenecks and production breaks. Mancha's new design book, "Selecting the Proper Locomotive," is a must for the mining man. Circle no. 38.

CUSTOM INDUSTRIAL HOSE: Carlyle hydraulic hose assemblies can be custom made to the exact needs of any application. For a copy of Carlyle's catalog describing in detail the standard and custom couplings and hoses available, circle no. 39.

PREVENT DOWN TIME: That's the title of a Caterpillar booklet devoted to the methods of preventive maintenance. Increase production and prevent breakdowns by avoiding trouble with machinery failures. Circle no. 40.

AIR-POWERED MINE HAULAGE: Eimco's new two speed air motor locomotive is designed to increase the efficiency of air-powered transportation. Air pressure is transferred to the maximum possible tractive effort through the new transmission with which the unit is equipped. For further information, circle no. 41.

NEW MAGNETIC SEPARATOR: Dings Magnetic Separator Company is now producing a new cross-belt type EBK unit for the concentration of such slightly magnetic materials as monazite, garnet, hubnerite, ferberite and manganese. Full information on new features, including a new pole nose construction that has doubled separating capacity, is available by circling no. 46.

NEW MOTORIZED HEAD PULLEY: Representing a new departure from conventional types of conveyor drives, this new motorized pulley is a fabricated steel drum, normalized to relieve stresses, with self-contained electric motor and reduction gears. The new Schrock unit will find application in mining, milling and crushing operations, where its compactness will reduce space requirements and its simplicity and mobility provides major time and labor economies. For detailed bulletin issued by Yuba Mfg. Co., circle 47.

PUMPING SMALL PULP VOLUMES: New Wemco bulletin describes lightweight compact features of 1¼" and 1½" line of sand pumps. To obtain copy of Bulletin No. P-15-1-1 circle 52.

LONG-RANGE SCRAPER EXCAVATORS: New Sauerman Bulletin describes methods for fast haulage by a single operator of large yardages from any point within cable radii, including down into deep pits, up hills or across a wide stockpile. For complete catalog circle 55.

NEW SYMONS "V" SCREEN: Nordberg Mfg. Co. has announced a new high-capacity unit for sharp separation of wet or dry materials from 4-mesh to very fine sizes. Machine combines centrifugal action with five times the force of gravity with a gyratory movement, providing greatly increased capacity and utilization of product heretofore difficult to screen. For complete data circle 60.

For Free Product Literature, see other side

Sheave Block Designed For Faster Slushing

The firm of Sauerman Bros., Inc. has enlarged its line of Durolite tempered steel sheave blocks by adding a block designed essentially for fast, trouble-free slushing. The sheaves and frame are of differential heat treated alloy steel. Swivel fittings are quick opening and

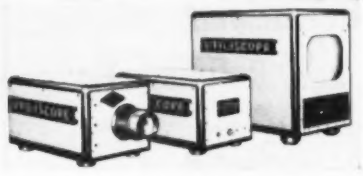
free moving. A bead cast in the frame protects the rim of the sheave and prevents cable fouling.

Important new features are a wider flatter sheave grooves to permit the use of a larger cable, an extra wide throat opening to pass knotted cables, and less weight than other blocks of similar capacity for easier handling in tight places. Circle no. 66.

Industrial Television For Better and Safer Control

The Diamond Power Specialty Corporation, first in industrial television, has designed a new installation for the visual control of processes that are normally difficult or impossible to observe. Multi-camera systems can be used to enable a single monitor to watch any number of operations through a simple series of switches .

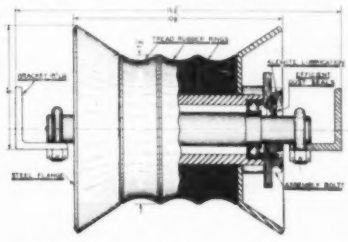
The units are built to function efficiently where heat, gases, or inaccessibil-



ity prevent normal observation. Cameras are available with lens turrets and focusing lenses controlled from the monitor or viewing set, providing normal or telephoto focusing from 10 inches to infinity. For information on the latest in industrial control, get Diamond's bulletin 1025-A by circling no. 70.

Rope Haulage Cushioned With Rubber Cuts Costs

For low-cost haulage in inclined shafts and slopes, the Vulcan Iron Works makes a rope roller field tested under actual operating conditions.



The design of the Vulcan roller features ball bearings and alemite lubrication for quick starting and low friction losses, efficient dust seals to prevent bearing wear, heavy construction for long roller life, and cheaply and quickly replaceable rubber rings to cushion the rope for reduced maintenance and repair. For further information on Vulcan's rollers, cicle no. 80.

Closer Mining Control With New Femco Phones

A newly-designed and simplified telephone system has been designed by the Farmers Engineering and Manufacturing Company specifically for far flung operations where close control will result in increased ore output, time and cost

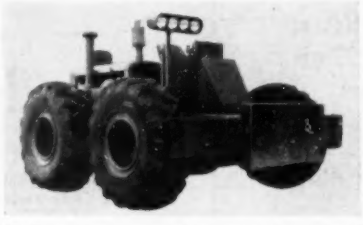
savings and improved teamwork and safety.

The Femco Trolleyphone is offered as "one of the simplest, most useful communication systems ever devised" for use in mines and mills. The plug-in models, more compact and easier to install and service than previous models of similar equipment, from a common communication system than can be operated from a wide variety of alternating or direct current power supplies. To get bulletin no. 25 describing Trolleyphones, circle no. 68.

New Tractor Pusher Unit Designed by LeTourneau

A new pusher unit, called the Tournatractor, is being offered by R. G. LeTourneau, Inc. for operators who are using dozers exclusively as pushers.

The pusher is a new version of the Super C Tournadozer with the dozer



blade, power control unit, A-frame and dozer controls replaced by a massive 3 by 15-inch billet that spans the width of the machine and carries a large pusher plate.

The Tournatractor, easily converted to a dozer, can be equipped with a torque-converter as original equipment. The unit is adaptable to pulling operations either with a rear power control unit or with its drawbar alone. For more information on the Tournarocker, circle no. 69.

precipitates—NORTHWEST

DMPA Copper Contract Awarded to Howe Sound

Howe Sound Company, producers of copper in Chelan County, Washington, has been granted an over-ceiling contract by the Defense Materials Procurement Agency covering nearly 9,000,000 pounds of electrolytically refined copper.

The contract, sixth of its kind, will cover a year's production from Howe's Holden mine, and was granted after the company said the mine could not stay in operation under the present price ceiling of 24.2 cents a pound for electrolytically refined copper, f.o.b. custom smelter. The premium of 4.7 cents a pound will cover 8,834,000 pounds of copper.

This action is in line with the DMPA policy, established last December, of government aid where necessary in order to assure continued supply of needed copper. (All such agreements terminate automatically in the event price ceilings on copper are removed, and also may be cancelled by either party on 60 days' written notice.)

Gibbonsville Company Gets Production Loan

Second production loan granted in the Pacific Northwest has gone to Gibbonsville Mining and Exploration Company to recover an estimated $2,500,000 worth of lead, zinc and silver from two placer claims 1½ miles west of the Bunker Hill smelter at Kellogg, Idaho.

The Reconstruction Finance Corporation has approved a $62,000 loan to build and equip a 400-ton mill. The Defense Material Procurement Agency has guaranteed the company a base price of 15 cents a pound for lead and 15½ cents for zinc until the loan is repaid.

Wellman Clark, Spokane mining attorney and company vice president who applied to the DMPA for the loan 18 months ago, said that the firm can sell directly to the government if the price of lead or zinc concentrates should fall below the basic floor price.

Silver Summit—Polaris Merger Agreed Upon

Silver Summit and Polaris Mining Companies, two of Idaho's largest silver-lead mining firms, will be consolidated on the basis of one share of Polaris stock for three of Silver Summit. This merger will combine Silver Summit's extensive area of unexplored ground and strategically-located deep shaft with Polaris' 300-ton flotation mill, surface plant and working capital.

An unusual feature of the consolidation was a provision that 50 percent of the stockholders of each firm must approve of the action, as must half of the stockholders of Hecla Mining Company, which owns approximately two-thirds of the outstanding Polaris shares. (Polaris, in turn, owns 64.36 percent of outstanding Silver Summit shares.) The companies legally could have effected the merger without consulting the minority stockholders of either Polaris or Silver Summit, but instead chose to, in effect, allow this latter group to make the decision.

The conversion ratio of three shares of Silver Summit stock for one share of Polaris was arrived at in an arbitrary manner, as shown in an application for additional securities filed with the Securities and Exchange Commission. Since Silver Summit did not encounter ore on its property until 1948, there has been insufficient development work done to make it possible to estimate the value of the claims. Consequently, any valuation of the property would have to be based on prospective value. L. J. Randall is president of both companies.

Hecla, Newmont, and New Jersey Zinc mining companies have started deepening the Atlas shaft near Mullan in the Hunter district of the Coeur d'Alenes, Idaho. This follows a year of preparation which included construction of surface plant, widening and straightening 9,000 feet of tunnel, tracking the tunnel with heavy rail, cutting a new hoist room and a rope raise, installing a new 400-hp, double-drum hoist, and pumping out the 800-foot shaft. Work is being pushed on a three-shift basis. Plans call for sinking the vertical, three-compartment shaft 1,600 feet—from the present 800-foot level to the 2,400-foot level—in the hope that mineralization on the 800 level will become commercial with depth.

Two groups of mining claims a few miles to the east of the Atlas project, just across the Idaho-Montana border, have been purchased by *Hecla Mining Company*. Purchase contracts filed with the Mineral County, Montana, recorder, show them to be the old *Amazon-Dixie* group of seven patented claims and 16 unpatented claims, and the *Golden Eagle* group of four patented claims and a patented mill site.

Idaho's State Land Board approved the application of S. K. Atkinson of Boise to dredge the Snake River near the proposed Hells Canyon Dam site for gold, monazite, and other minerals. A tentative approval has also been granted by the Oregon State Land Board which had originally voted against Mr. Atkinson but has now reversed its decision. The Hells Canyon Dam has not yet been approved by Congress. If it is, however, it will get prior right over Atkinson's project. A time limit has also been set on the dredging so Atkinson hopes to get under way as soon as possible.

EXPLORE FOR ZINC AT IDAHO MINE

With the help of a DMEA loan, Elmer Enderlin and Henry Connolly are driving a crosscut to a vein in their Meadowview mine near Fourth of July Lake in Custer County, Idaho. The government is paying $4,560 of $9,120 to be spent to explore for zinc on the property. The Meadowview claims were originally located in August 1950. During the 1951 season, two miles of access road were built by bulldozer; a portable 160-cubic-foot LeRoi air compressor was installed; and 53 feet of crosscut were driven with an Ingersol Rand JA55 Jackhamer on Ingersol Rand Jackleg. This season, they expect to complete the crosscut through the first vein and to continue about 85 feet or until they cut the No. 2 vein. Then, they will drift on each vein for a distance of about 50 feet to determine the value of the ore at this depth. The dump from the crosscut is shown on the lower left of the photograph above. The portable compressor can be seen at the foot of the talus slope below the dump.

Whitedelf Mining and Development Company has announced signing of a contract with R. S. McClintock, Spokane mining contractor, to sink an additional 400 feet in the *Whitedelf* mine near Clark Fork, Idaho. Work will be done under a $120,250 DMEA project to reach ore reserves indicated by diamond drill holes put down by the U.S. Bureau of Mines. The present 400-foot, two-compartment, inclined shaft will be continued at a 70-degree angle.

Idaho Beryllium and Mica Corporation is producing 70 pounds of sheet mica daily, according to Albert K. Smith Jr., resident engineer in the firm's *Muscovite* mine, 10 miles north of Deary, Idaho. Thirty-five women are employed in sorting and trimming. Production is expected to be boosted to about 200 pounds daily. Scrap mica and some beryl crystals also are produced.

Lessees Walter Schmittroth of Kellogg, Idaho and Jack Etherton of Smelterville are making shipments of scheelite ore from the property of *Big It Mining and Milling Company* in the Trapper Creek area of the Pine Creek zinc-lead district, Idaho.

Sunshine Consolidated, Inc. is stoping a new ore body on the 3,100-foot level of its property on Big Creek in the Coeur d'Alene mining region of northern Idaho. Norman M. Smith, company geologist, said the ore body opened to date is 235 feet long, and the ore taken from drifting carries about 45 ounces of silver to the ton.

American Smelting and Refining Company has resumed underground development work at the Vulcan Silver-Lead property in Lake gulch west of Wallace, Idaho, according to J. E. Berg, manager of the firm's Northwest operations. Work was suspended in January 1951, for shaft repairs. Development ore is being milled, when available, at the Galena mill.

Sun Valley Lead-Silver Mines, Inc., recently resumed work at its *New Hope* property in the Warm Springs mining district of Idaho. A lower tunnel project is nearing completion at the firm's *Blue Kitten* property.

Idaho Birthday Mines Company, operating near Lowman, Idaho, has tunneled more than 1,700 feet in nine months. Company officials believe they are nearing the anticipated downward extension of a silver-gold vein productive near the surface. The new adit will gain 800 feet in depth.

Good silver-lead-copper mineralization is reported to have been opened by bulldozer stripping of *Eastern Lead Corporation* ground near Pottsville, east of Mullan, Idaho.

Sidney Mining Company of Kellogg, Idaho, has extended the *Sidney* mine shaft to the 1,300 level and is preparing to open that level for mining. Production is running between 5,000 and 6,000 tons monthly. Malcolm Brown is superintendent.

National Silver-Lead Mining Company has resumed development work at its property south of the *Sunshine* mine on Big Creek in the Coeur d'Alenes of Idaho. Reopening of an old upper tunnel is the first work planned.

Simplot Fertilizer Company is planning to increase its phosphate production from the present 2,000 tons to 4,000 tons per eight-hour operating shift this year, according to a report by Charles W. Sweetwood, superintendent of its *Gay* mine 18 miles east of Fort Hall, Idaho. Since mining began in 1946, more than

1,900,000 tons have been shipped and more than 3,000,000 cubic yards of waste overburden removed.

Idaho Antimony Company of Kellogg, Idaho has been incorporated for $300,000 by John B. George and Fred S. Albinola, both of Kellogg, and Clarence C. Dunkle of Pinehurst.

Stockholders of *Idaho Silver Corporation* have voted to accept 771,000 shares of *Silver Mountain Lead Mines* stock for their property near Mullan, Idaho. They will receive one share of the new stock for each 3.482 shares they now hold. The Silver Mountain firm has proposed consolidation of a half dozen contiguous properties in the Hunter mining district for development by *Sullivan Mining Company*, a *Bunker Hill-Hecla* enterprise.

MONTANA

The *Montana Phosphate Products Company* of Garrison, Montana, reportedly has offered a bonus of $4,160 for phosphate leasing of 520 acres of government-owned land six miles northeast of Gold Creek in Powell County, Montana. The company was the only bidder. Although a minimum bonus of $5 per acre was required, the company offered $8. For this type of lease, the government charges rental beginning at 25 cents per acre annually, and reaches $1.00 per acre in the fourth year. The government also receives royalty from any phosphate rock or phosphate and associated products produced by the mine.

North Butte Mining Company of Butte, Montana, reports that it has made application to the Government for a loan to start mining zinc ores from its blocked out zinc reserves and has also applied for an assured price for zinc for a five-year period. A contract for the milling and treatment of zinc ores has been negotiated with the *Anaconda Copper Mining Company*. North Butte expects to start producing zinc ores as soon as funds are available for this purpose.

Lexington Silver-Lead Mines, Inc. is planning to mill dump ores at its Niehart, Montana property and to undertake an exploration program, according to J. A. Allen of Spokane, Washington, president. A 2,000-foot easterly crosscut will be started shortly after the mill is in operation. The firm has also applied for a DMA loan to drive a 1,700-foot crosscut to cut three known veins.

Lucky Lead Mines, Inc. has been organized in Montana by Earl T. Ellis and associates of Seattle, Washington. They are reported to have taken over the *Nonpariel* group of patented claims in the Princeton district near Phillipsburg, Montana, and are said to be currently negotiating to acquire another sizeable group in the same district. Equipment and machinery are being assembled to begin operations. Main offices are in the Radio Central Building in Missoula.

Report of a silver ore strike near Saltese, Montana has been made by Charles Buls, president of *Mineral King Mining Company* of Missoula, Montana. The discovery is said to have been made accidentally by a highway construction crew.

The *Montana Steel Corporation* has filed articles of incorporation and has is-

sued 100,000 shares of no-par stock. Directors are G. H. and D. F. Whittaker of Seattle, and W. H. Maloney, E. S. Mashek, and M. R. Copper, all of Butte.

Installation of modern mining equipment at the *Prosperity* mine northwest of Superior, Montana, is planned by Fred Wilson, Jr. and Mauritz Engdahl of Missoula. They have reported opening a silver-lead-copper vein in a new tunnel about 30 feet below the surface. The property, four miles northeast of the old town of Keystone, is part of the old *Baltimore* group.

WASHINGTON

Sullivan Mining Company, developing the Metaline district holdings of *Metaline Mining and Leasing Company*, plans to crosscut to the U.S. Bureau of Mines' diamond drill holes and raise to develop mineralization disclosed in the holes. This was reported by Karl W. Jasper of Spokane, president of Metaline Mining and Leasing. He said raises from the 600 to 800 level also are planned. Development work in 1951 included nearly 2,000 feet of drifting and crosscutting and nearly 5,000 feet of diamond drilling.

The DMEA has approved a $47,500 lead-zinc exploration program at the Metaline district holdings of *Jim Creek Mines, Inc.* of Spokane, Washington. The government will furnish half of this sum. The money will be spent to explore an ore body partly exposed in a shaft. The ore body was discovered in bulldozer operations. An incline shaft has opened lead-zinc-silver milling ore over a width of about 4½ feet, according to Val Y. Preston, president.

High grade silver-lead ore has been found in the *Old Dominion* mine near Colville, Stevens County, Washington, by Earle B. Gibbs, co-owner with Ira Hunley of Spokane. Gibbs said the strike was made 200 feet beyond old workings in the lower tunnel which was caved for many years.

Northwest Magnesite Company has awarded *Pacific Bridge Company* of San Francisco a contract to remove between 300,000 and 400,000 yards of overburden at its Red Marble quarry near Chewelah, Stevens County, Washington. Howard Ziebell is general manager.

Aluminum Company of America has started operation of the first smelting line at its Wenatchee plant in Washington. As new units are constructed, production will gradually increase until the plant's capacity of 170,000,000 pounds of aluminum annually is reached. The Federal government gets first call on all output for the next five years. Plant construction started a year ago and is ahead of schedule. Completion may be achieved this year. W. N. Farquhar is manager of the plant.

The *Telesite Mining Corporation* of Seattle, Washington, is reported to have leased the *Sherman* group of 15 claims on Pogue Mountain in Okanogan County, Washington. Development operations are already under way with the driving of a 170-foot tunnel. The company has also leased 720 acres of land from Victor Smith, a rancher in the area.

precipitates—ROCKY MOUNTAIN

Climax Receives DMPA Aid to Mine Low-Grade Ore

The Climax Molybdenum Company will mine 17,000,000 tons of low grade ore at a cost of $9,500,000 at its Climax, Colorado mine under an agreement made with the DMPA.

Under the terms of the agreement initial output of molybdenum will be bought by the government at $1.24 per pound. The current market price is $1.00 per pound. The contract price will be reduced to between $1.00 and $1.07 after the project is well under way.

The ore for which the agreement applies is so difficult and costly for the company to mine that customary mining practice would be to abandon it and concentrate on production of higher grade ore in a lower level of the mine. With the government support it will now be able to mine the ore and recover the vitally needed molybdenum for defense.

U. S. Vanadium Testing Black Hills Uranium

The United States Vanadium Company has secured prospecting and mining rights on about 120 mining claims known as the Roy E. Cord group in Craven Canyon, Harney National Forest, near Edgemont, South Dakota.

The claims are on the southern flank of the Southern Black Hills and were located last fall, following the discovery of uranium in that area.

United States Vanadium has two wagon drills testing the claims and is stripping overburden preparatory to mining. L. D. "Andy" Anderson and John E. Jenks, Jr. direct USV's South Dakota mining operations from the company's office at Edgemont.

Acme Mining Drifts On Carbonate Queen Vein

The Acme Mining Company with headquarters in San Francisco, California has completed rehabilitation work at the Carbonate Queen mine in Eclipse Gulch in the Cripple Creek mining district of Colorado, according to W. A. Hayes, president and general manager.

The Eclipse shaft has been repaired, and clean-ups and surveys have been made on the 2nd and 3rd levels. A power line has been completed from the Ajax mine. A cross cut has been started east on the 2nd level by the four-man crew under superintendent Cub Peterson of Cripple Creek.

The next projected development is a drift following the Carbonate Queen vein south on the 3rd level to the granite-breccia contact. Cross cuts will be driven in both directions along the contact. Future plans include reopening and further developing of the mine's lower levels.

The *Silver Bell Mines Company's* subsidiary, *Four Corners Uranium Corporation*, has started an exploration program for uranium-vanadium ore in the Cactus Rat area south of Cisco, Grand County, Utah. Mining of ore for shipment to the *Climax Uranium Company's* Grand Junction, Colorado plant continues under the direction of William N. Binder, superintendent.

Ray Clark and Laurence Erdmann of Breckenridge, Summit County, Colorado are cleaning out the Owl Tunnel on Gibson Hill, preparatory to extending the tunnel to cut, at depth, the projected extension of lead-bearing veins mined through workings from the top of the hill.

The Jeffrey mill at Montezuma, Summit County, Colorado is being operated by John and Vera Jeffries. The mill serves as a custom mill for the Montezuma district and has been treating ore from the *St. John* and *Quail* mines.

The *Uranium Ore Producers Association* has announced that the United States Atomic Energy Commission has engaged the Colorado School of Mines Research Foundation for an independent engineering appraisal of sampling procedures in uranium-vanadium processing plants in Colorado and Utah. These plants are owned by both the AEC and private companies. Investigation of sampling is to be made after association president W. E. Haldane; secretary Ken Turner; and director Norman Ebbley reported wide variances in sampling of custom ore shipments to several plants.

The *Minerals Engineering Company* of Grand Junction, Colorado, is operating 33 diamond drills for the U.S. Atomic Energy Commission and the United States Geological Survey in Colorado, Arizona, and Utah, according to Ray Sullivan vice president and general manager. Under drilling contracts with the U.S.G.S., eight diamond drills are operating at *Dolores* mines, Montrose County, Colorado; six at the *Joe Dandy* mines, Montrose County; and two in the West Paradox district of Montrose County. Drilling for the A.E.C. is at Bull Canyon, Montrose County, Colorado, where six drills are in operation; two at Moab, Grand County, Utah; two at Temple Mountain, Garfield County, Utah; one in the Henry Mountains of Wayne County, Utah; and six in the Lukachukae Mountains, Arizona.

The *Climax Uranium Company* has been diamond drilling on its uranium claims on Rifle Creek, Garfield County, Colorado. Marvin L. Kay of Grand Junction is general manager.

Sandy Stearns of Rifle has leased the *Rifle Creek* vanadium-uranium mine from the *United States Vanadium Company*. He will mine ore under contract for USV's Rifle mill. Initially production is to be at the rate of 50 tons per day. The ore is low in uranium content and is used as a supplement for higher grade uranium ores shipped from Mesa and Montrose counties, Colorado and Grand County, Utah to bring the Rifle plant to capacity operations.

The *American Smelting and Refining Company* is continuing its geological exploration and diamond drilling program in the Marysvale uranium district, Piute county, Utah, according to chief exploration engineer Keith Whiting. Exploration is being conducted on both company-owned and leased claims.

The *J. R. Simplot Company* is continuing exploration for uranium-vanadium ores south of Green River, Utah, under terms of an agreement with the DMEA. Surface diamond and percussion drilling is under the direction of Ruff Dunn, exploration manager.

The *E. J. Longyear Company* of Minneapolis, Minnesota has embarked on a large-scale, claim-leasing campaign just north of Tintic, Utah. For the past several years, the company has conducted extensive geological examinations of the area followed by underground development and underground diamond drilling.

Metal Producers, Inc., which has been operating the *Horn Silver* mine and a flotation mill near Milford, Utah, has closed its operation because of the recent drop in the lead and zinc prices. Resumption of operations will depend on nonferrous metal prices, according to D. C. Peacock, manager.

Seventeen beryl bearing claims in the Sheep Rock Range, Juab and Tooele counties, Utah have been leased by three West Tintic miners—Richard Ekker, Marjorie Ekker, and Bernell Thomas—to the *Brush Beryllium Company* of Cleveland, Ohio according to reports. Surface prospecting and assessment work has been completed on the claims. Projected future exploration will consist of diamond drilling from the surface.

The Kennecott Copper Corporation has received a certificate of necessity permitting 75 percent accelerated amortization of $3,350,000 to be used in renovation of the company's Magna and Arthur flotation mills to permit additional production of copper and molybdenum.

The United States Geological Survey has a 25 man crew at work doing geological mapping, and geophysical and geochemical prospecting on claims of the *Chief Consolidated Mining Company* in the Tintic district. According to reports the USGS will also make similar surveys on the Tintic claims of the *Tintic Standard Mining Company*. The USGS is to diamond drill the claims to verify theories as to ore deposition based on interpretation of surface geochemical results.

precipitates—CENTRAL and EASTERN

Winter Supply of Iron Ore Critically Affected

The steel mills and the nation are losing iron ore at the rate of 200,000 tons per day during the strikes in the mills and iron ore mines. This is the ore vitally needed for the winter season when the ore boats are ice-locked. Imports of iron ore from Venezuela and Chile have been curtailed because striking steel workers will not unload ocean-going carriers at Bethlehem Steel Company's Sparrows Point plant in Maryland.

Company officials are meeting with the CIO Steelworkers Union in an attempt to obtain release for immediate shipment of 7,000,000 tons of ore stockpiled at the Upper Lakes.

It is ironic that never before in the history of the steel industry, even during the two wars when conditions were very difficult, was any furnace ever shut down for lack of ore.

Tungsten Mining Firm Will Expand North Carolina Mill

The Tungsten Mining Corporation has completed its new crushing plant and flotation mill addition at its Hamme tungsten mine in Vance County, North Carolina. This addition permits the corporation to expand mining and milling from 325 to 600 tons per day. Mine capacity is also being increased and new steel headframes and ore bins are being built at the Sneed No. 7 and Central shafts. New and larger hoists and skips are also being installed to permit faster hoisting of greater tonnages of ore. J. R. Sweet, general manager is supervising the program assisted by J. C. O'Donnell, superintendent.

DMPA to Stockpile Lead for Civilians

A civilian stockpile plan has been set up by the Defense Material Procurement Agency to prevent any loss in production of lead during the current period of low demand and soft prices.

The DMPA will buy 30,000 tons of lead before the year's end at the prevailing market prices. If demand for lead increases before the year is over, the stockpiled material will be resold to private industrial users. Any metal remaining in government hands by December 31, 1952 will be turned over to the military stockpile. The Budget Bureau has made between $9,000,000 and $10,000,000 available to the DMPA for this purchasing program.

Inland Steel Expects More Ore from Bristol in 1952

The Inland Steel Company expects to be operating on the 15th level of the Bristol mine at Crystal Falls, Michigan by fall of this year. The 15th level is 1,526 feet below the surface. Present operations are centered on the 12th level where pumping and shaft repair are continuing.

Inland Steel acquired the Bristol mine from fee owners in 1938. It had been abandoned in 1933 and had been slowly filling in with corrosive water which had virtually destroyed steel sets used in the mine by the previous operators.

The Bristol's ore is classed as semi-hard, consisting of a dark red specular hematite. The method of mining being carried on is known as sub-level stoping. Former operation was by the shrinkstope and pillar-cave method. A 36-inch belt conveyor has been installed on the 12th level to transfer ore from the working face to the shaft. This conveyor has been constructed in four flights with a total length of 1,719 feet between head and tail pulleys. The belt has a capacity of 250 tons per hour, and operates at 200 feet per minute. Ore from the mine adjacent to the Bristol shaft is being mined and raised to the surface via the Bristol skips. This adjacent property is owned by the Oliver Iron Mining Division of the U. S. Steel Company. Former operators of the Bristol also mined ore from the Oliver property.

The Bristol is one of four mines operated by Inland Steel on the Menominee Range. Ore shipped from the Bristol in 1951 totaled 192,000 tons, and management expects a greater tonnage in 1952 as more of the mine is placed in operation. R. D. Satterly is general superintendent of Inland's iron mines, while Philip Pearson is superintendent of Inland's Menominee Range operations.

TO TRANSPORT FREEPORT SULPHUR

Six insulated steel barges like the one above will be used by Freeport Sulphur Company to transport molten sulphur to Port Sulphur from the deposits to be mined in the Louisiana marshland late this year. Two of the barges will carry the liquid sulphur from Bay Ste. Elaine, which will be mined by an amphibious plant anchored permanently on piles driven into the mud at the bottom of the bay. The remaining four barges will transport sulphur from Garden Island Bay, the largest single sulphur development anywhere in the world in 20 years. Built at a cost of $150,000 each, the tank barges eliminate the need for costly storage facilities and dock installations at the two sites.

Potter & Sims Mines, Inc. has closed its Sucker Flats mill at Webb City, Missouri, and its Alba strip pit until conditions in the zinc market improve. The Snapp mill and pit are continuing to operate, however, while churn drilling and geological studies are being made at the Alba pit.

The new $1,000,000 General Research Laboratory of *International Minerals and Chemical Corporation* has been formally opened at Skokie, Illinois. Emphasis will be placed on broader research aimed at the production of new chemicals and further diversification of International's operations.

Eagle Picher Company of Miami, Oklahoma, has made a cash offer of $8,125,000 to the *Ohio Rubber Company* for the purchase of all of the latter's common stock. Eagle Picher's primary business is in the mining and smelting of zinc and lead, but it is also an important paint manufacturer and a producer of insulating materials.

Rumors of a uranium strike near Seligman, Missouri have been reported but

not confirmed. However, representatives of the Missouri and Arkansas geological departments have been investigating the area, and the *Ozark Mining Company* is said to be sinking a shaft above the cave where the strike was supposedly made.

A drill has been set up on a property known as the Ernest Hamel farm near Champion, Michigan, where the *Jones & Laughlin Steel Corporation*, under a joint agreement with the U.S. Atomic Energy Commission, will explore for uranium ore. A showing of uranium ore has been uncovered on the Hamel farm and further tests are considered warranted.

General Smelting & Refining Company has been formed to explore and redevelop old mining properties at Gold Hill near Salisbury, North Carolina. It is reported that the firm will be assisted by the U.S. Bureau of Mines and the Tennessee Valley Authority in its exploration work. A local smelter may be built if investigation discloses any gold ore of value.

The *Carborundum Metals Company, Inc.*, a new subsidiary of *Carborundum Company*, has signed a contract with the Atomic Energy Commission for the production of zirconium and hafnium sponge metal. Both are produced from zircon sands from Florida. The contract provides for the sale of about 150,000 pounds of zirconium and hafnium a year, for a period of five years, at the unit price of less than $15.00 per pound.

The *St. Joseph Lead Company* has entered the oil business. The mining company's certificate of incorporation has been extended to include oil, natural gas, and mining operations of all kinds. A contract has been made with the *Continental Oil Company* to drill 11 exploratory wells—six in West Texas, one in Southern Louisiana, one in Northern Louisiana, one in California, one in Oklahoma, and one in Montana. The company also expects to sign a contract with the *Zephyr Drilling Company* to drill three other exploratory wells—two in Wyoming and one in Colorado. At the same time the company also proposes to drill one well on a 6,000-acre tract in Southern Illinois. In the event of discovery of oil, gas, or minerals in paying quantities, the company would develop and operate the area for the joint account of Continental Oil and St. Joseph Lead.

Ledoux & Company is building new laboratories and offices at 359 Alfred Avenue in Teaneck, New Jersey, and plans to move from its New York quarters about October 1. The new plant will have more than double the present floor space and the company hopes to broaden its scope so that all of these facilities will be utilized.

A total of 21,000,000 pounds is the goal set by the *Defense Production Administration* for the supply of cobalt from foreign and domestic sources by 1955. This is an increase of 11,000,000 pounds over the 1950 supply. Figures include cobalt content of ore, concentrates, oxide, and other compounds, in addition to metal. The Belgian Congo is the prin-

cipal source of cobalt but more than half of the increase planned will be from domestic sources, through increased cobalt recovery in refining nickel and copper, and by other methods.

The *Oliver Iron Mining Division's King* mine at Coleraine, Minnesota, will be ready to begin ore shipments soon after the strike-bound mines resume work. The King has an estimated tonnage of 6,629,374.

Stripping operations at *Hanna Ore Mining Company's Enterprise* mine at Virginia, Minnesota started in the latter part of April. Present plans call for shipment of ore from this property during the 1952 season.

Zontelli Brothers, Inc. have arranged with the city of Ironwood, Michigan to obtain water from the Montreal River for their Ironwood heavy-density plant. The plant treats material that came from the sinking of the Pabst, Norrie, and Aurora shafts nearly 60 years ago. Trucks carry the crude ore from the old shaft dumps to the plant.

The *Jones & Laughlin Minnesota Ore Division* began shipments this season from its *Wentworth* mine near Aurora, Minnesota, following a stripping program. Except for a shipment of 851 tons in 1915, this is the first season for the Wentworth as a producer. Estimated tonnage of the property is slightly more than 1,000,000 tons. The Wentworth is Jones & Laughlin's most easterly operation.

Until the Lake Superior iron ore mines went on strike, *Pickands Mather & Company* was hastening work on the development of its *Fortune Lake* property in Michigan. Briar Hill Creek has been diverted and the open-pit area had been cleared of brush. About 2,400,000 cubic yards of surface overburden and 1,100,000 cubic yards of rock will be removed and some 1,200,000 tons of ore will be shipped during the next three or four years. After the open-pit mining has been completed, the mine will become an underground operation. The Fortune Lake will be the third open-pit mine on the Menominee Range, the other two being small pits near Iron Mountain.

Pickands Mather & Company is also active at the *Lawrence* mine southwest of Crystal Falls, Michigan. The old Carpenter mine shaft is being repaired to provide access to the Lawrence and this work has now reached about 650 feet. A new surface plant consisting of engine house, shop, and dry is to be built and a permanent headframe will be erected at the Carpenter shaft. The Lawrence is expected to be in operation by 1954.

Contracts for two unloading machines and a conveyor belt system which will be installed at the new ore unloading pier on the Delaware River have been signed by the *Pennsylvania Railroad*. Actual construction of the $8,000,000 pier is under way, and should be in service by the summer of 1953. The pier is designed to handle iron ores enroute to U.S. steel mills from new sources under development in Venezuela, Brazil, Chile, and Labrador, as well as other foreign ore. It will be equipped to handle two ships at once, with provision for eventually expanding capacity to four ships.

Three new buildings, costing $250,000 will be erected by *Interlake Iron Corporation* at its *Perry* plant in Erie, Pennsylvania. Scheduled for construction are a $110,000 pig iron casting building, a $100,000 structure to house special machinery, and a $40,000 building. Earlier this year, authorization was granted for the construction of a $60,000 iron ore storage bin.

Because of wet, soft material encountered at about 115 feet, the *Hanna Iron Ore Company* is using compressed air to complete its new *Cannon* shaft at Stambaugh, Michigan to solid rock. The Cannon shaft is one quarter mile east of the present *Bengal-Tully shaft* which will continue in operation until the Cannon is finished. The Cannon will be 1,700 feet deep, of steel and concrete, and 15½ by 20 feet in diameter. It will serve ore reserves on the six forties comprising the property. The new buildings being erected to serve the Cannon shaft will require some 18 months to complete. When finished, the Cannon mine is expected to have a model surface plant, the most modern and efficient on the Menominee Range of northern Michigan. The main buildings, containing dry, shops, offices, and heating plant, will form a U-shaped structure. The main hoist house will be 60 by 206 feet, while each of the two wings of the U will be 60 by 220 feet. A 38- by 130-foot garage will also be erected.

precipitates—SOUTHWEST

California's Penn Mine Acquired By New Firm

The lease-and-option-to-purchase agreement formerly held by Penn Chemical Company on the Penn mine at Campo Seco, Calaveras County, California, has been assigned and transferred to New Penn Mines, Inc. The new firm has been organized under the laws of Nevada by Goldfields American Development Company, Ltd. for the purpose of taking over, operating, and further developing this famous old mining property. (See *Mining World*, June 1952). W. C. Browning will be in charge of operations.

The new company plans to unwater the lower levels of the mine in order to reach deep-seated ore chutes formerly developed by Penn Mining Company, owners of the property, before they discontinued operations in 1926. While these ores are being uncovered and prepared for mining, the capacity of the mill on the premises will be increased considerably.

Before the suspension of mining operations after World War I, the ores were profitably smelted on the premises for the production of blister copper. During that time, only such ore was mined as carried the maximum of copper and the minimum of zinc because of the difficulties caused by the latter in the process of smelting for the recovery of the more valuable copper content. Now that zinc is in much greater demand and milling processes have been developed for the satisfactory separation of complex, mixed sulfide ores, the zinc ores left in the mine by the former operators have become well worth exploiting.

The smelter plant was scrapped in 1920 and the large slag dump resulting from the many years of operation was sold in January 1948 to Richmond Rock Wool Company. However, the mineral rights of the area underlying the slag dump area were reserved to the mining claims.

Rubicon Operations Start At Tungsten Property

Diamond drilling operations and exploration at depth of the mineralization that crops out on the surface are underway at the tungsten property of Rubicon Mining Company near Big Meadows in Placer County, California.

Last season, H. G. O'Hanlon, vice president and general manager in charge of operations, together with Ernest Grant, a mining engineer, explored and sampled the tungsten structure for a distance of three miles. Their project resulted in the Rubicon Mining Company securing satisfactory leases from the Pacific Gas and Electric Company and the Southern Pacific Railroad on their holdings in that area adjacent to located claims of Rubicon. Diamond drilling will now determine the extent and depths of the deposits.

A 100-ton reduction plant is planned for the property as soon as four miles of road are completed.

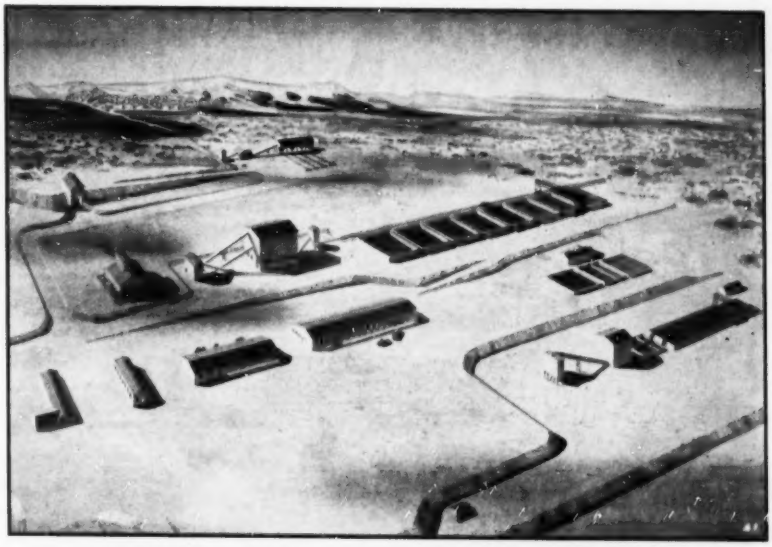
R. S. Dixon is president of Rubicon. The main office is at West Point, California, and a field office is being established at Big Meadows.

A 90-foot winze was completed recently in the north drift of the 100-foot level of the *Boston-Arizona* mine, five miles east of Skull Valley, Arizona. Drifts are now being driven from the bottom of the winze and the adit tunnel is being driven south. Ore has been encountered on the adit level and work is progressing to determine the size and values of the deposit. The Boston-Arizona was acquired late in 1951 by McFarland and Hullinger of Tooele, Utah, and they expect to do sufficient work to determine the production possibilities of the property. John M. Johnson is mine superintendent, employing a crew of nine men.

The *Iron King Branch* of the *Shattuck Denn Mining Corporation* at Humboldt, Arizona, is sinking a new four-compartment vertical shaft by stripping down a series of raises driven from the 15th level. The 1,800-foot level will be extended from the No. 6 shaft and a raise driven to the 15th level on the center line of the new shaft. The shaft is expected to be ready for use late in 1953 or early in 1954. In the meantime, the Iron King mine is maintaining production at approximately the 1951 rate, using two shifts a day in the mine and three at the mill. Production in 1951 was 18,500,000 pounds of zinc, 9,500,000 pounds of lead, 700,000 ounces of silver, and 20,000 ounces of gold. Lead concentrates are shipped to El Paso for smelting, and the zinc concentrates to Amarillo. H. F. Mills is general manager and A. L. Pessin is mill superintendent.

McElvaney & Harryman have leased the *Black Chief* manganese claims owned by D. C. Townsend of Bouse, Arizona. Preliminary work has been started to prepare for production. The new operators expect to have considerable equipment, including jigs and table plant, and a crew of six to eight men working within a short time.

The *Seneca Mining Company* has leased the *Pine Top* asbestos mine in the Salt River district of Gila County, near Globe, Arizona. Three men were employed initially, moving in equipment and getting ready to start production. Production is currently at one ton of fiber per day and is expected to triple shortly. A new body of fiber is now being mined with the fiber reported to be from three to six inches long, and of the semi-harsh type. Louis Rayes is owner and manager.



ANACONDA'S YERINGTON PLANT

Above is an artist's conception of the new plant being built by Anaconda Copper Mining Company at Yerington, Nevada, where ore from the open pit will be crushed and leached. Production is scheduled to start late in 1953, with 60,000,000 pounds produced per year during the first two years of operation. Thereafter, output will be about 66,000,000 pounds annually. The townsite in the distance, now under construction, has been named Weed Heights after the company's president Clyde E. Weed, who is largely responsible for the decision to undertake development of the property.

Ralph Pomeroy of Mesa, Arizona, has leased the *Ajax* mine in the Mineral Hill district, and has a small crew employed in development work. At present the shaft is being repaired and pumps will be installed to unwater the property. The Ajax is a lead-zinc property owned by W. C. Smith of Coolidge, Arizona.

A small tonnage of uranium ore is being produced from the *Red Bluff* group of four claims in the Flourine district of Gila County, Arizona. All work to date is in open cuts. The property is owned by Carl Larson, Globe, Arizona.

The *B.S. & K. Mining Company* is shipping approximately 120 tons of 56 to 58 percent zinc concentrates and approximately 60 tons of 27 percent copper concentrates monthly from the *Atlas* mine near Red Rock, Arizona. Twenty-five men are presently employed in both the mine and mill under the direction of A. M. Kalaf, manager.

Shaft sinking has been started at the *Black Nugget* manganese mine by the *Gil Ted Mining Company*. Five men are employed. The work is directed by Ted Standley, president, and V. D. Standley, manager, both of Aguila, Arizona.

An agreement has just been completed whereby the *Three Musketeers* property, four miles north of Vicksburg, Arizona, has been leased to A. R. Floreen of Chicago, Illinois, and associates. The property is a recent tungsten discovery owned by L. C. Huthmacher of Wenden, Arizona, and John Brusco and John Wood of Salome. Development work so far has been largely by open pit and a few shipments of scheelite have been made by the discoverers.

The *Cobalt Mining Company* of Mayer, Arizona, has started an exploration program at the *McCabe* mine, six miles west of Humboldt. The first work to be undertaken is drifting from the bottom of the 40-foot shaft on a vein which appears to be a split from the main McCabe vein. Later, the shaft will be deepened and exploration continued if favorable results are obtained from present work. The McCabe is owned by the *Harbud Mining Company* of New York. L. G. Robineau is in charge of the present work.

Some tungsten is being recovered from the Boriana Gulch placers, below the old *Boriana* mine near Yucca, Arizona. Several claims have been located for two miles down the gulch and prospectors are at work with washers and other equipment. While part of the placer values are undoubtedly from erosion of the Boriana veins, it appears that most is from mill losses in the tailing of older operations at the Boriana when tailing was allowed to run down the gulch.

Hewitt Wolfe of Globe, Arizona, and associates have started a development program at the *Starlight* mine in the Stanley Butte district of Graham County. This is a lead-zinc property, and intermittent shipments of ore (about five tons weekly) are being made to the El Paso smelter. A compressor and some miscellaneous equipment were recently installed.

About 100 tons of lead-silver ore are being shipped from open cuts at the *Money Metals* group of four claims in the Miami district of Arizona. Louis Winn of Globe is part-owner of the property and in charge of the work.

Philip F. Stevens and Harold Stevens of Arivaca, Arizona, have acquired the

Tiger group of seven unpatented claims under lease with option to purchase. They are cleaning out the 250-foot shaft and are now down 67 feet. They will retimber to that depth, after which the water will be pumped out and the shaft repaired when necessary. The ore is a lead carbonate, said to run about 20 percent lead, 24 ounces silver, and a trace of gold. Old workings include the 250-foot shaft being reopened and a 125-foot shaft, plus 1,300 feet of drifting on the 150-foot and 250-foot levels.

Roy Bell shipped two carloads of silver-lead ore from his lease on part of the *Montana* mine in the Oro Blanca mining district of Arizona. Because of the diminishing values in the ore body he was mining and the 4 cent drop in the price of lead, he deemed it advisable to give up his lease and to return to a gold property he formerly operated in central Arizona. The owner of the Montana, Hugo Miller of Nogales, is shipping a 60-ton car of middlings left in the dump from the table mill operation in 1927 and 1928.

The *Lighthouse Mining Corporation* of Barstow, California is buying scheelite-bearing ores or will mill such ores on a custom basis. The price charged for custom milling is dependent upon the character of the ore, and concentrates will be returned to the customer. Scheelite ore may be sold outright for $36 per short ton (dry weight) unit of contained tungsten trioxide. No lots of less than 30 tons will be accepted. Interested persons should write to Box 306 at Barstow.

Idaho-Maryland Mines Corporation has moved its general offices from San Francisco to the mine headquarters at Grass Valley, California.

Allied Mining Company reports that it is shipping one carload a week of chrome ore from the *Pilliken* property in El Dorado County, California, to the governments stockpile at Grants Pass, Oregon. Low-grade ore is to be stockpiled awaiting installation of a concentrating plant near the mine.

The *Shooting Star Tungsten Company* has reactivated the old *United Tungsten* mine in the Morongo mining district of San Bernardino County, California. The mine was last operated during World War I.

American Potash & Chemical Corporation has started construction of a research laboratory in the Los Angeles area at Whittier, California. The new facility will cost $300,000 and will be completed early in 1953. The unit will supplement the present laboratory and pilot plant at Trona where the company's principal operations are located. The research program initially will emphasize boron and lithium compounds derived from the company's own raw materials.

Blythe Manganese Company is mining manganese ore from the *Arlington* group of claims, located 30 miles northwest of Blythe, California. A 300-foot tunnel has been completed tapping the bottom of the old *Blackjack* mine workings, and low-grade ore is also being mined from two nearby open pits.

Willow Valley Mines at Deer Creek, Nevada City, California, has reopened for 1952 operations. Considerable equipment has been added to speed up development of the property. Operations this season will continue in the tunnel which has been driven a distance of 3,000 feet. Carl J. Tobiassen is superintendent at the mine.

NEVADA

A $60,000 contract has been awarded to the University of Nevada by the U.S. Atomic Energy Commission for developmental studies of methods of processing uranium ores and concentrates. The university will study beneficiation of low-grade uranium ores and extractive metallurgy for the recovery of uranium and other values from ores and concentrates. The studies will be conducted on a laboratory and unit process scale, and no new facilities will be constructed.

The *Cahill* quicksilver mine in the Poverty Peak silver district of Humboldt County, Nevada will be closed permanently and the machinery and equipment will be removed. The decision to suspend operations came after the difficulties of a particularly hard winter coupled with the high costs of operation. Mrs. Dorothy Cahill of Reno is owner of the property which was leased to *Cahill Mines Inc.*

Newmont Mining Corporation's diamond drill program is moving along on a 24-hour-a-day schedule on the eastern fringe of Goldfield, Nevada. The old Siebert lake bed was cut at about the 435-foot level, almost half of the depth to which the first test hole will be sunk, but values shown by core assays have not been reported. A second test site has already been selected south of the present hole, and drilling will be undertaken when the first project is concluded. Work is reportedly slowed down by the need for casing the drill hole as greater depth is attained.

A reverbratory furnace is being installed at the *Wall Canyon* antimony mine in Nye County, Nevada, to convert ore into metal.

Mr. and Mrs. Earl Fowler have taken a lease on the *Molini* mine in the White Mountains of Nevada. Development work is expected to start soon.

A. Z. Hall has taken a three-year lease on the *Crown Point Globe* mine at Johnny, south of Beatty, Nevada. The property is owned by the widow of the late "Happy Jack" Overfield. Hall had been leasing the *Seven Trough* mine near Lovelock, Nevada.

The *Alpine Mining Company* of Spokane, Washington reports that it has decided to start construction of a 50-ton selective flotation mill as soon as clean ore shipments are being made from its *Noonday* mine 55 miles southeast of Wells, Nevada. Severe winter weather, combined with difficulties in obtaining air pipe and timber, has set the program 90 days behind schedule but rapid progress is now reported on work on the shaft. John B. White is president and treasurer.

FRH Mining Company is reported ready to start milling at its leased property on Castle Mountain in Lander County, Nevada. The new mill has a capacity of 100 to 125 tons daily. The Castle Mountain property is leased from *Castle Mountain Mining Company*. FRH Mining is also reported to have purchased six claims from Joe and Rudy Rundberg and will start work on them soon.

Goldfield Consolidated Mines Company has disposed of all of its shares in the *Goldfield Deep Mines Company* at Goldfield, Nevada. At one time, Consolidated held well over a million shares of Deep Mines.

A 350-hp. Diesel electric plant has been installed at the scheelite properties of *Nevada-Massachusetts Company* at Tungsten, Nevada. The unit will be a stand-by plant capable of furnishing 20 percent of normal demand in case of a power disruption. The company is presently milling 450 tons of tungsten ore daily from four scheelite properties. The deposits have been developed to a depth of more than 1,000 feet.

Daily shipments are being made from two of the manganese properties being developed by *Golden Century Industries* in Lander County, Nevada. Roads have been improved, camp buildings built, and open-pit mining is now being carried on at the Jersey Valley property, under lease from *Western Alloys, Inc.* of Salt Lake City, and the *Carico Lake* property, purchased from Bob Holdren of Elko. The firm also recently purchased the *Golden See* manganese property, 15 miles south of Valmy, and two manganese properties at Indian Springs, 85 miles south of Battle Mountain. Development work on these will begin soon. The lease and purchase of additional manganese properties in Lander and Humboldt counties is under negotiation.

The new tungsten mill to be operated by *Baltimore Camas Mines Inc.* near Ely, Nevada, is almost ready for production. A Marcy ball mill capable of handling 100 tons of ore in 24 hours has already been installed and other equipment is being moved from Hailey, Idaho. The mill will be set up principally for tungsten processing but, with additional equipment, will be able to handle other ores.

NEW MEXICO

Kennecott Copper Corporation has installed 21 two-way FM radio sets at its mine in Santa Rita, New Mexico for use in the gigantic open pit. Because of the vastness of the operations which cover an area about three miles in diameter, no other communication system was satisfactory The radio sets are installed in the control tower, in trucks, in electric and Diesel locomotives, and in a mobile crane. The ten mobile truck units are assigned to pit foremen, the sample department, the track department, the general foreman, chief electrician, pit superintendent, power foreman, and electrical trouble shooter.

A $175,000 office building will be erected by the *International Minerals & Chemical Corporation* at the mine site near Carlsbad, New Mexico. Plans call for the construction contract to be let within the next few months and the building to be completed about six to nine months after that. Offices of the manager, assistant manager, mine superintendent, superintendent of maintenance, and construction, accounting, shipping, purchasing, and engineering and drafting staffs will be located here.

The U.S. Atomic Energy Commission and *Anaconda Copper Mining Company* have announced the establishment of a new ore-buying station near Grants, New Mexico, for the purchase of various types of uranium-bearing ores. This will be the first to provide a market for the high lime ores of the Grants area, though uranium was first discovered there in the summer of 1950. Anaconda owns the depot.

The *New Mexico Mining Association* is filming a special color, sound movie depicting the various steps and phases involved in the state's mining industry. It will feature the important role of the modern prospector in exploration, development, and production, along with an explanation of the latest scientific methods, processes, and equipment developed through research and engineering. Rare and industrial minerals found in New Mexico will be shown in their natural state as well as in the finished gem or refined product. The movie will have its first showing at the first annual meeting of the Southwest Mineral Conference in Albuquerque, November 6 to 8.

The Bureau of Indian Affairs in Washington, D.C. has approved a leasing agreement between the Laguna Indians and the *Anaconda Copper Mining Company* for uranium mining on 800 acres of Laguna land. The firm will continue to explore the 405,000-acre reservation to try to find more uranium suitable for mining. The present mining site is a mile and a half east of Paguate Village, New Mexico, in the north central part of the reservation. The Lagunas will get a 10 percent royalty on ores bringing $10 or less per ton, with an additional 1 percent for each extra $10 per ton, up to 20 percent. Minimum payments provided are 25 cents an acre for the first year, 50 cents for the second and third years, and $1 for each additional year.

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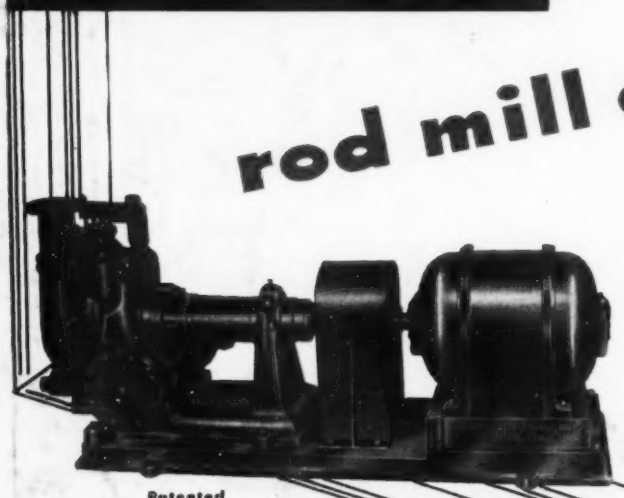

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